No. 1863 Vol. XLVI SEPTEMBER 7th, 1944

FLIGHT

and

AIRCRAFT ENGINEER

OFFICIAL ORGAN OF THE ROYAL AERO CLUB ONE SHILLING

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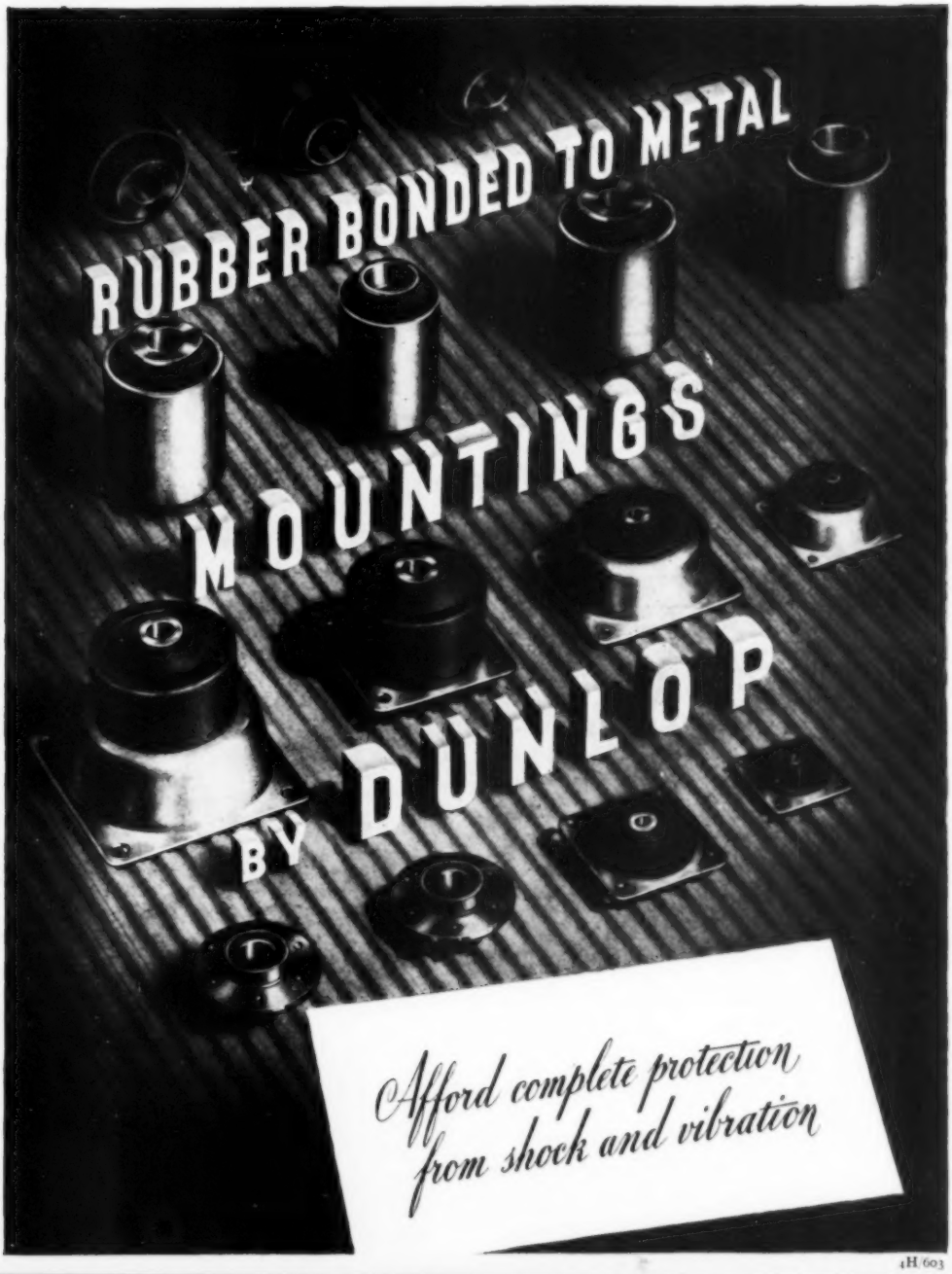
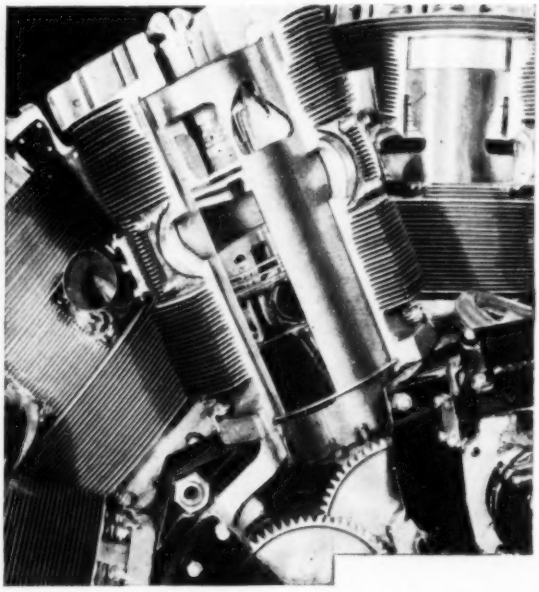


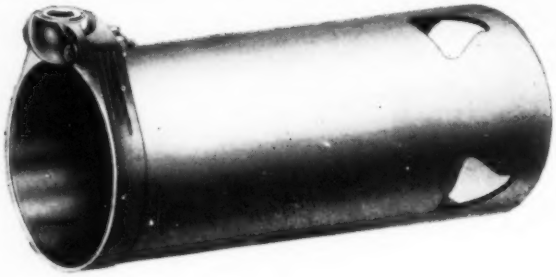
Advantages of the simple sleeve-valve . . . No. 3.



BECAUSE lower boost pressures and higher compression ratios are characteristic with "Bristol" sleeve-valve engines, and because the sleeve ports give larger effective valve areas and less restriction to gas flow, cylinder and exhaust temperatures are greatly reduced.

This drop in temperature, coupled with the fact that all bearing surfaces of the cylinder and sleeve except the combustion chamber are fully and continuously lubricated, not only minimises fire risk but entirely eliminates the likelihood of lead corrosion. No wonder "Bristol" engines last longer.

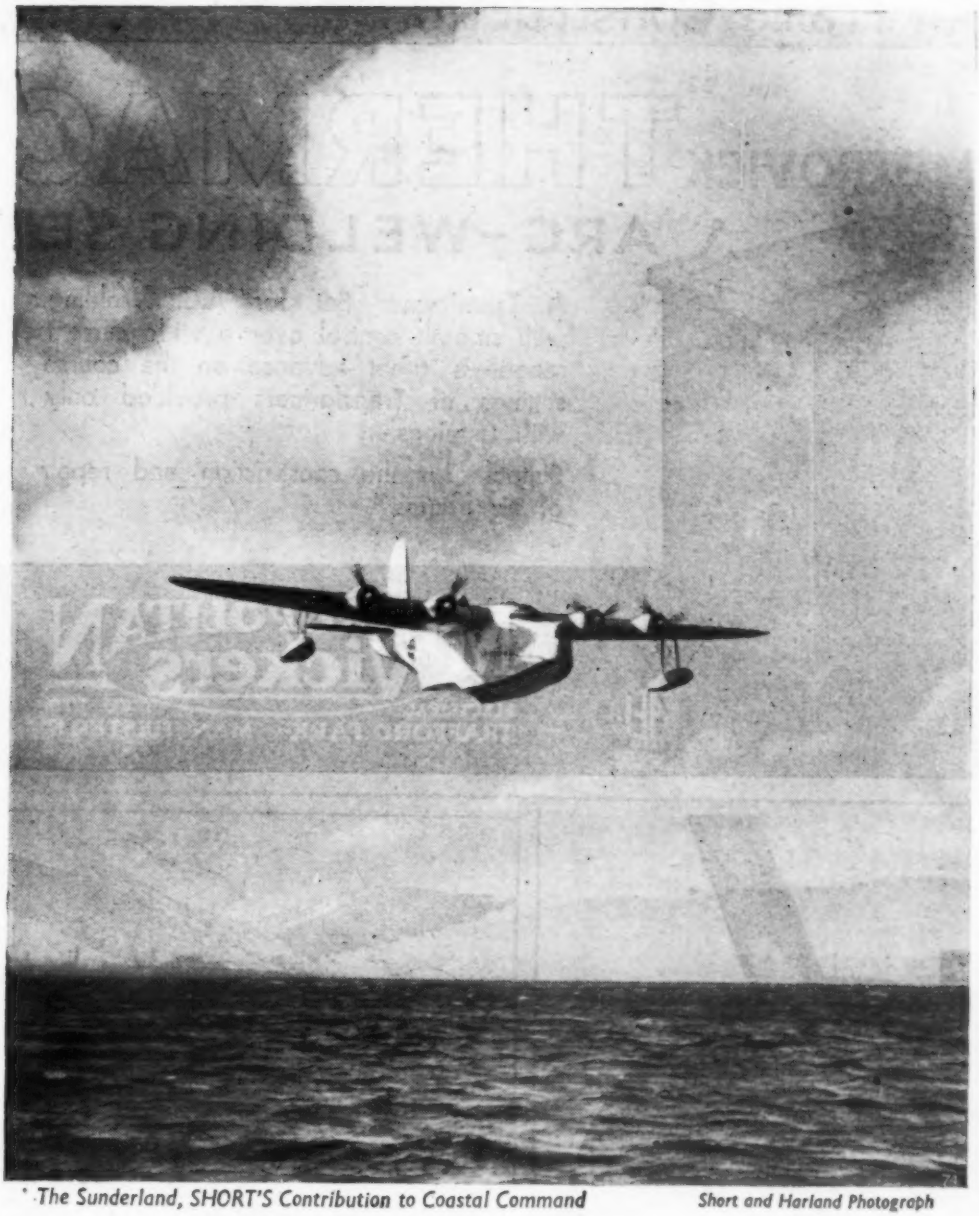
This is one of a series of twelve advertisements prepared for retention, and constitutes a simple story of sleeve-valve advantages. Previous copies are available on request to the Bristol Aeroplane Company Ltd., Bristol.



Perseus, Taurus, Hercules, Engines

Bristol *pioneered and developed the single sleeve-valve engine*

536 E



The Sunderland, SHORT'S Contribution to Coastal Command *Short and Harland Photograph*

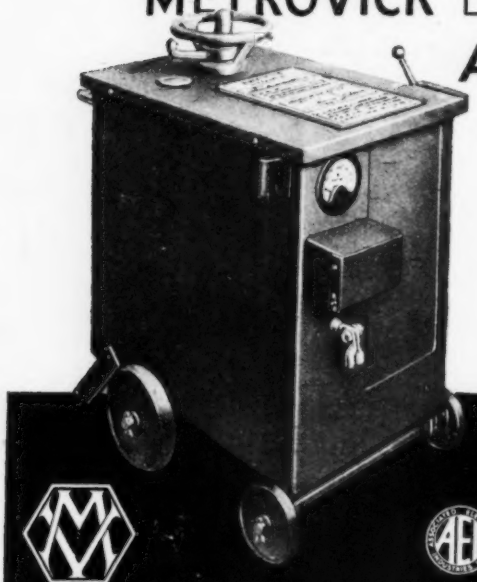
Short Brothers
England

THE OLDEST ESTABLISHED AIRCRAFT COMPANY IN THE WORLD

For Air Frame Construction and Repair

METROVICK "THERMAC"

ARC-WELDING SET



A Transformer Set for A.C. Welding, with smooth control over a wide current range—a great advance on the coarse settings of Transformers provided only with tappings.

Suitable for the construction and repair of air frames.

METROPOLITAN Vickers ELECTRICAL CO., LTD.
TRAFFORD PARK ··· MANCHESTER 17.

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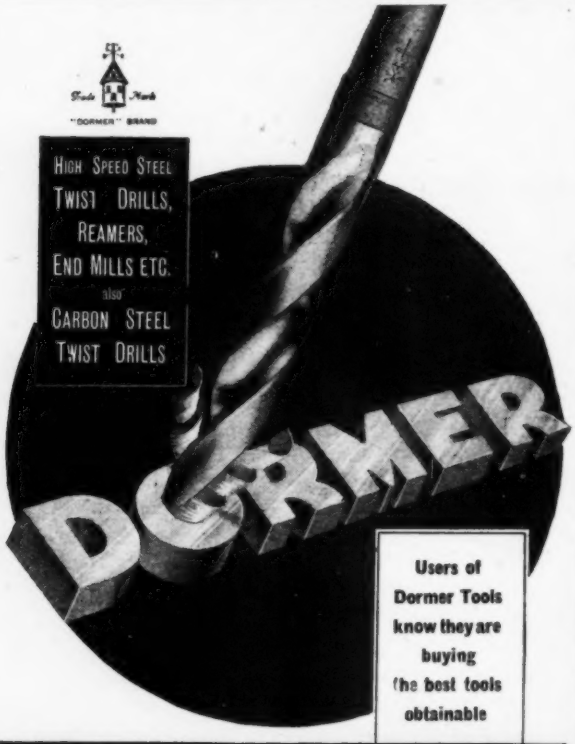
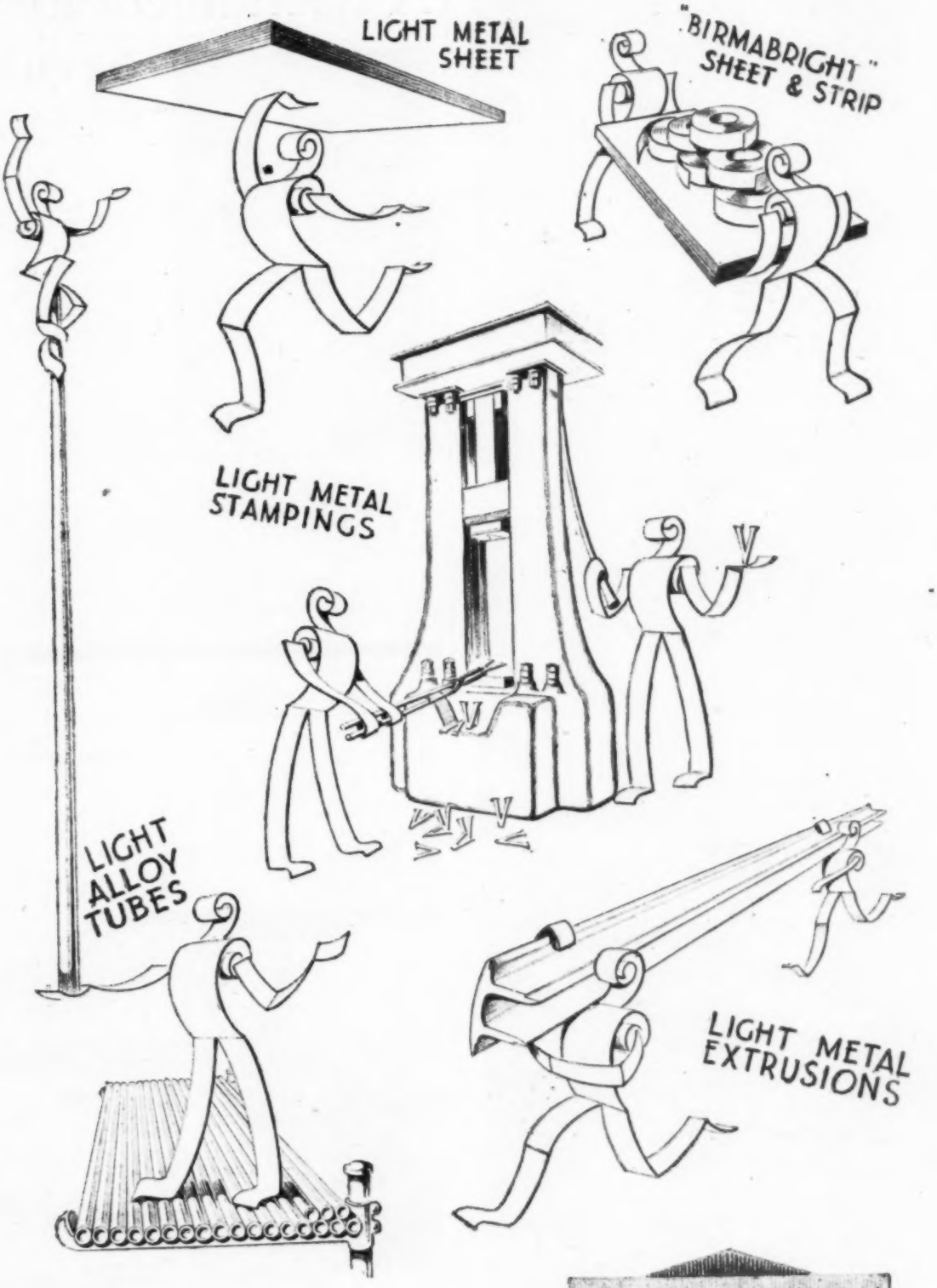

"DORMER" BRAND
HIGH SPEED STEEL TWIST DRILLS, REAMERS, END MILLS ETC.
also
CARBON STEEL TWIST DRILLS
DORMER
Users of Dormer Tools know they are buying the best tools obtainable

THE SHEFFIELD TWIST DRILL & STEEL CO., LTD., SUMMERFIELD STREET, SHEFFIELD.

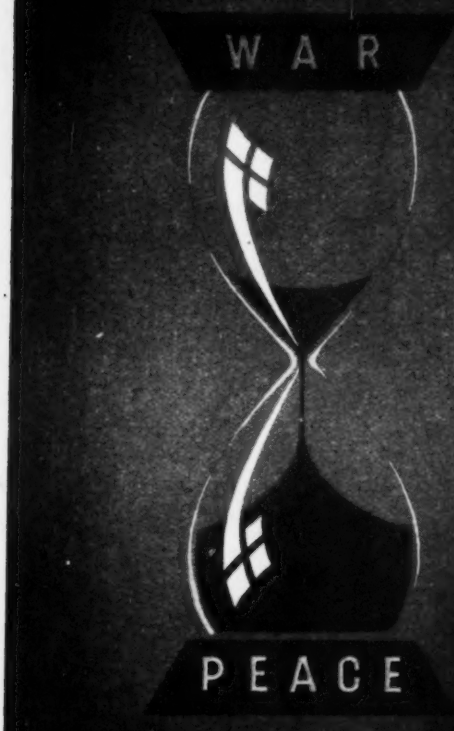
"ACCURATE" ARIC

AIRCRAFT INSTRUMENTS

WINDSOR HOUSE · VICTORIA STREET
LONDON, S.W.1.



BIRMETALS LIMITED ·
BIRMINGHAM · 32

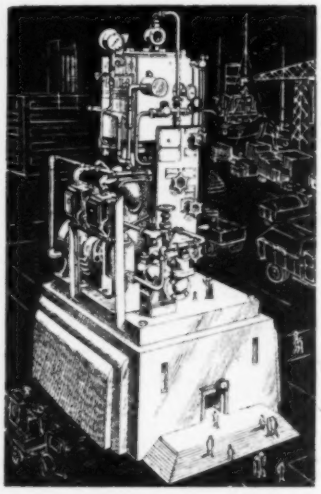


Slowly but surely, as the sands run, we approach the great transition.

SPERRY

AIRCRAFT PRECISION INSTRUMENTS

A Monument to Saving



The Metafilter is a monument to an enormous saving of valuable oils and still more valuable time. For the Metafilter not only frees lubricating oils, cutting oils, and coolants from suspended impurities and completely removes even the finest ferrous swarf—considered hitherto impossible to trap—but it also enhances the quality and speed of production.

Metafiltration

THE METAFILTRATION COMPANY LTD.
BELGRAVE ROAD, HOUNSLOW, MIDDLESEX
Telephone: Hounslow 1121/2/3. Telegrams: Metafilter, Hounslow.

Having demonstrated straight and level flying, the Instructor instils confidence in his pupil early in his course by allowing him to take complete control of the aircraft, but ensuring against serious mistakes. Thus the pupil learns quickly by experience as well as precept
at
MARSHALLS'
FLYING SCHOOL
CAMBRIDGE
The Pupil takes control
THESE DAYS WILL RETURN . . 4

FLIGHT
and
AIRCRAFT ENGINEER

First Aeronautical Weekly in the World : Founded 1909

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The Outlook

Prevention of Aggression

AT Dumbarton Oaks, near Washington, delegations from the United Kingdom, the Soviet Union and the United States have been discussing plans for preserving the future peace of the world after the aggressive power of Germany and Japan have been broken. President Roosevelt commented at one of his Press conferences that the one thing to which all people subscribed was the need of an organisation to "step on" war before it grew up. There was, he said, nothing hard and fast about the ideas discussed at Dumbarton Oaks save the recognition that in case anyone in the future began to kick over the traces, there must be some sort of small international body to act quickly.

In that sentence the two important words are "small" and "quickly." The old League of Nations, which embodied noble ideas, was intolerably cumbrous. It was too large, and it was too slow in action. It did nothing about Japan's aggression in Manchuria; and when Fascist Italy attacked Abyssinia it could only rise to futile "Sanctions," which strengthened rather than weakened Mussolini's hand.

It is notorious that councils of war almost invariably decide to do nothing. It will be remembered that Clive only once summoned a council of war, and it voted against fighting the Battle of Plassey. Clive disregarded its decision, with immense consequences. Such instances from history could be multiplied almost indefinitely. The more drastic the action which the council of war is asked to consider, the less likely is it to vote for doing anything.

The future League of Nations (or whatever it may be called) must of necessity be a council of war. No one nation could be placed in sole charge of peace and war—still less would it be possible to have one man, even were he as gifted as Clive. But the great thing is, as President Roosevelt said, to keep the executive body small. If one could conceive Churchill, Roosevelt, Stalin and, perhaps, de Gaulle, as a permanent, ageless council, the prospects of future peace would be indeed bright. As things are, the world must choose the smallest possible number of the strongest and wisest men from the victor nations.

The Instrument

SCARCELY less important than the composition of the executive council is the choice of the weapon to be placed at its disposal. Thoughts inevitably turn at once to the air, chiefly because it is the swiftest of all forces in action, and no frontiers can bar its progress. An International Air Force was a subject studied even before the outbreak of the present war.

The early conception, naturally, was a force of bombers; though opinions varied as to how this force should be composed and administered. We do not propose to discuss such details now. The point to consider is that bombers are too drastic in their action and, as was said above, the more drastic the weapon the greater will be the hesitation about using it. Hesitation is likely to nullify all the good to be derived from a small, energetic council. President Roosevelt said in the interview quoted above that the international body must act quickly—and hesitation is the negation of speed. Even though bombing has reached, within the last year, an accuracy never before considered possible, it is still not selective enough in its action. If some nation were suspected of beginning to "kick over the traces," the executive council of the League would almost certainly take time for thought before ordering bombs to be dropped, with the almost certain consequence of killing civilians; and, we repeat, thought is fatal to action.

A way out of the difficulty has been provided by the

recent developments in airborne troops. Nothing but a fully equipped Army can stand against them. For "stepping on a war before it has grown up," they are an ideal instrument. They can move with all the speed of bombers, and they can land and investigate the charges or suspicions of incipient aggressive action. If demolitions are needed, the airborne troops can carry them out without any fear of killing innocent civilians by accident. Their operations are likely to be entirely bloodless.

Because of all these safeguards against abuse or outrage, the executive council would feel little or no hesitation in ordering an airborne force to proceed to a certain place and take what action was found to be necessary.

Private Ownership

PROBABLY many a hopeful prospective aircraft owner will feel a bit depressed after reading "Indicator" in this week's issue on the subject of private ownership. Very briefly, our correspondent's argument is that for the sake of safety (of those on the ground no less than of those in the air) very high standards of airworthiness will have to be maintained after the war; this means expensive inspection and maintenance; and these, in turn, spell relatively few private owners of aircraft.

From the number of letters which we receive it is evident that the enthusiasts who expect to fly their own small aircraft after the war are numerous, and one can sympathise with their plans. But nothing is gained, in the long run, by blinding oneself to facts. And it is, we fear, an indisputable fact that private flying will be expensive. Costs have increased during the war, and there is little prospect of their coming down for some years after the cessation of hostilities. Aircraft building materials are likely to be in rather short supply for quite a while, and wages will in all likelihood remain high.

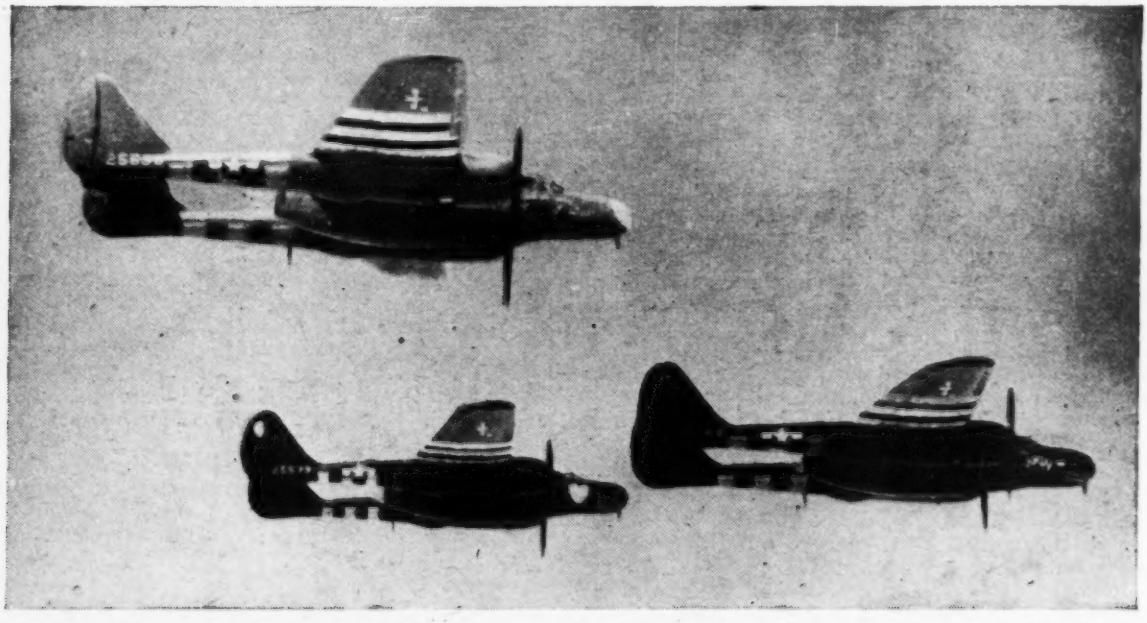
That is not to say that there will be no private flying after the war. We hope and believe that there will be a good deal. But we do incline to agree with "Indicator" that for the large majority the type of flying which we used to call private flying, to distinguish it from service and commercial flying, will not be in privately owned but in hired aircraft.

We on *Flight* have always held the view that private flying has much more in common with yachting than with motoring. And just as many thousands manage to get a vast amount of enjoyment out of hiring yachts—on the Norfolk Broads, for example—so we believe that after this war great numbers of Service pilots and others will be content with hiring private aircraft. This will not be comparable with private ownership, any more than a hired yacht on the Broads is a substitute for one's own boat in which one can go farther afield, but it will not be a bad second-best.

As to the organisation that will be needed to run an aircraft hire service efficiently, there is much room for argument. "Indicator" gives a very good pointer, to which we hope our readers will contribute *their* views.

CONTENTS

The Outlook	247
War in the Air	249
Here and There	252
Sea Otter and Seafire	254
Mosquito Fighter-Bombers	257
Aircraft in Flying Attitudes	263
Topics of the Day	264
Behind the Lines	265
U.S. Naval Airships	266
Correspondence	270
Service Aviation	271



"BLACK WIDOWS" OVER FRANCE: These Northrop P-61s may well be hailed by the French not as venomous spiders but as *Veuves Joieuses*. Fritz is more likely to accept the American meaning. The machines are being used by the American Ninth Air Defence Command under Brig. Gen. Schramm. Another picture appears on p. 274.

An R.A.F. Spitfire taxying in on an airstrip in Corsica after keeping air cover over the armies invading the south of France.

WAR in the AIR

German Collapse in France : General Eisenhower Takes Command : R.A.F. Heavy Bombers Still Active : Russians in Rumania

SURVIVORS of the Old Contemptibles will remember a jingle which was popular among them towards the end of 1914. It ran:—

"Here we are, here we are, here we are again.
Drove them over the Marne; drove them over the Aisne;
And now we're here in Armentières
And here we are again."

It was a piece of doggerel very typical of Tommy Atkins, and it might not appeal in any way to the Doughboy; but the dashing advance of General Patton's tanks up to and across the two historic rivers named inevitably recalls the battles of 1914. Of course, the same lightning speed was not possible in the first year of the earlier World War. Tanks were then unknown, and biplanes which could exceed 100 miles an hour with their throttles full open were rarities. But when all allowances have been made, the speed with which the American 3rd Army has moved from Brittany to the scene of the ever-famous retreat from Mons and the "miracle of the Marne" will go down to history as a feat of arms and of supply not less remarkable than the victories of 30 years ago.

The advance of this 3rd Army and the simultaneous victory on the lower Seine by the 2nd British and 1st Canadian Armies, sealed by the capture of Rouen and the practical destruction of the German 7th Army, constituted a typical Montgomery battle. It was the greatest he had ever fought, and it may be the last battle in which he is in command of all the ground forces.

Some time ago the Prime Minister foretold that, while at the outset British and American forces in the Army of Liberation would be approximately equal, it was inevitable that in due course the Americans would outnumber the British and Empire troops. The landing of the 7th Army under General Patch in Provence has evidently now brought this about. The advance of that Army up the line of the Rhône has now proceeded so far that it would be illogical to leave it any longer under the Mediterranean Command. The liberation of France must be one movement, directed from

BOLT HOLES : Close-up of the machine gun and rocket projectile armament on the port wing of a Thunderbolt.

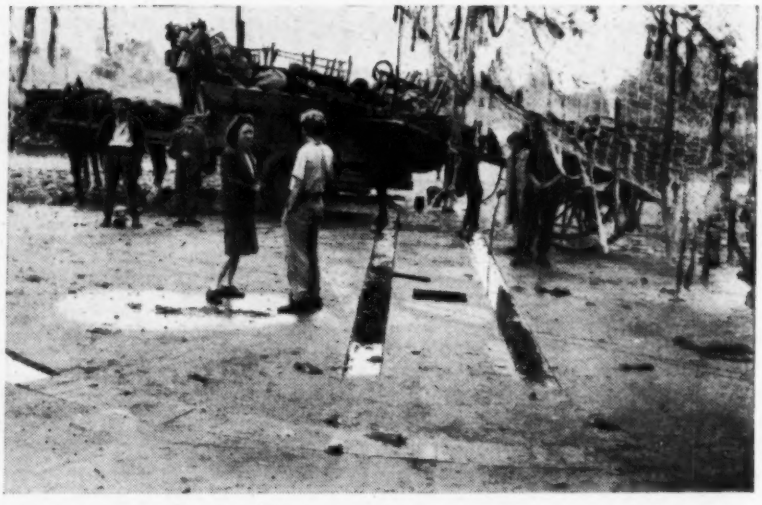
WAR IN THE AIR

one headquarters. General Eisenhower has accordingly taken over personal command of all the forces of liberation in France, and the 7th Army is added to his Command. It now belongs to France, not to the Mediterranean. Incidentally, it will be remembered that the 7th Army, like the 2nd Army, fought hard in Sicily.

Field Marshal Montgomery, therefore, ceases to be the commander of all the Allied ground troops in France, and becomes instead the commander of the 21st Army Group. General Bradley, who captured the Cherbourg peninsula and liberated Brittany, now commands the 12th Army Group (composed of the U.S. 1st and 3rd Armies) and is now of equal status to Sir Bernard Montgomery, from whom he has hitherto taken orders.

Where, it may be asked, does the air enter into all this reorganisation? The military correspondent of *The Times* has put forward one suggestion. He wrote on August 31st: "General Montgomery lacks the machinery to control the air operations which are so intimately linked with the land operations, whereas General Eisenhower, with his international staff of all Services, has this at his disposal."

In the leading columns of the last issue of *Flight* comment was made on the incongruity of an Army General thanking the air forces who had done—and done brilliantly—the work for which tactical air forces exist, namely, to help in a land battle; while infantry, engineers, artillery and armour were all lumped together in the term "we soldiers." The fact was that General Montgomery had no authority to issue orders to the Air Officer Commanding the A.E.A.F. He had to *ask* him to do so-and-so. That the two men worked together harmoniously and successfully is certain—but in military operations orders, not requests, ought to be the rule. For that reason it will be an advantage to have the Supreme Commander (whose Deputy, let us not forget, is Air Chief Marshal Tedder) in charge. He has authority to issue orders to all three Services; and though he may afterwards praise one or another, there will be no need for him to say "thank you."



ONE OF MANY: A partly built air torpedo launching site at Quetteville, captured by the Allies. The runway is about 50ft. long with about 2ft. 6in. between the rails. About half the whole launching site area is in Allied hands.

Heavy Bombing

AS was prophesied in these pages last week, the Russians captured Ploesti before the issue of *Flight* was published. Where they will be by the time this issue is in the hands of our readers we must decline to prophesy. But it is important news that the Rumanian port of Constanza has fallen into their hands. Their Black Sea Fleet was mainly responsible for this success; and, while marines landed to fight on shore, the aircraft of the fleet flew overhead to soften the resistance.

Up at the northern end of the long line the Germans massed their forces to defend East Prussia. Stubborn defence there was expected, for that original home of the dominant Prussian race is very dear to whatever Government holds sway at Berlin.

The movement of supplies up to the German armies near the Baltic was a great problem. The railways were inadequate, and as much as possible was sent by sea. Then Bomber Command took a hand, giving direct help to our Russian Allies. The two chief ports concerned in this supply business were Stettin and Königsberg. One attack on Stettin took place some time ago, and while the main force bombed the port a special force of Lancasters went down low and laid mines in the ship canal, which is now more important to the enemy than the Kiel Canal. The attack has been repeated.

Königsberg meant a much longer flight, and the Lancasters were in the air for more than ten hours. One attack lasted only some ten minutes, and the bombing was so concentrated that the defences were overwhelmed. They were strong defences, too, but the port had never before experienced a raid by machines of R.A.F. Bomber Command, and the novel experience was not enjoyed. Undoubtedly, as a result of these two raids, the hard-pressed German armies on the Baltic coast will go short of many things which they must urgently need, and the

AIR ON THE GROUND: The first R.A.F. contingent to land in southern France, waiting to disembark from their landing craft.

WAR IN THE AIR

task before the Russians will be accordingly eased.

The Ruhr also comes in periodically for attention from Bomber Command, and oil is a favourite target. The recent attack on the synthetic oil works at Homberg-Meerbeck calls for especial notice because it was made in daylight, and the Halifaxes were escorted by Spitfires. Not a single bomber was lost.

Coastal's Part

AN important part in the battle for the French ports, especially the U-boat bases in the Brest Peninsula, has been played by R.A.F. Coastal Command working in the closest co-operation with the Royal Navy.

Immediately the fall of these ports appeared imminent, Coastal Command aircraft, together with surface vessels, threw a ring around them. They thus prevented the beleaguered garrisons from obtaining reinforcements either of men or materials. In addition, by destroying a large proportion of the enemy's minesweeper fleet operating in the Bay of Biscay, air and surface craft prevented the movement of U-boats and other German shipping.

In the last three weeks Mosquitos, Beaufighters and Halifaxes have made nearly 300 attacks on nearly 150 separate targets from Ostend to Bordeaux. As a result of these attacks over 30 enemy vessels have been sunk, damaged or set on fire.

In the Channel, Avengers and Swordfish of the Fleet Air Arm operating under R.A.F. Coastal Command have scored several successes against E-boats operating both with torpedoes and mines. Two Do 217s have been destroyed and two others damaged by R.A.F. Coastal Command Mosquitos engaged on anti-shipping operations.

One particularly successful attack was carried out against a heavily armed escort vessel which, in the words of a "strike" pilot, was "bristling with guns."

After she had been attacked and left in flames by a force of Beaufighters, a Halifax directed a Naval force to the scene. The warships then shelled and torpedoed the enemy vessel. Many of the crew were seen to dive into the sea.

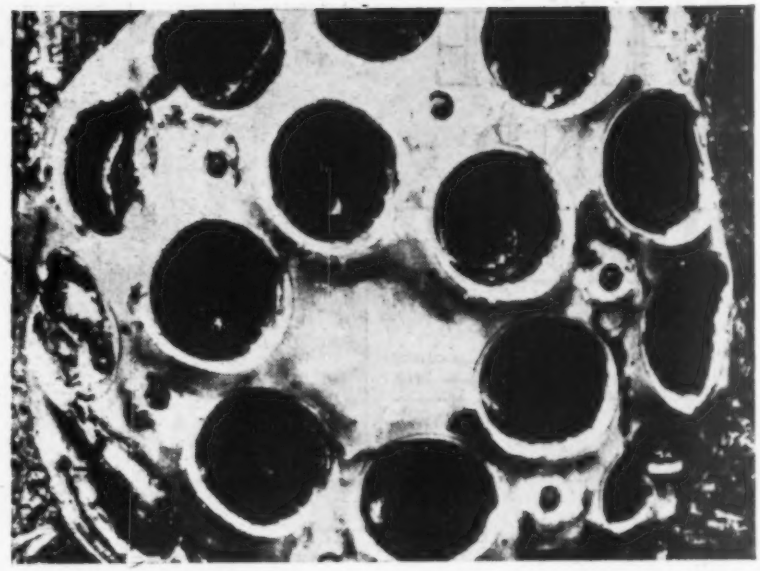
After signalling "ship abandoned," the Halifax exchanged mutual congratulations with the Naval force. On the following day, the Beaufighters attacked with rocket and cannon two more heavily armed escort vessels, scoring direct hits on both ships. Reconnaissance pictures revealed that one of these was definitely sunk, and that the other was still burning.

Despite heavy flak from shore batteries, R.A.F. Coastal Command "strike" aircraft equipped with rockets, bombs, cannon and machine-guns, have also attacked concentrations of enemy shipping seeking the safety of harbours.

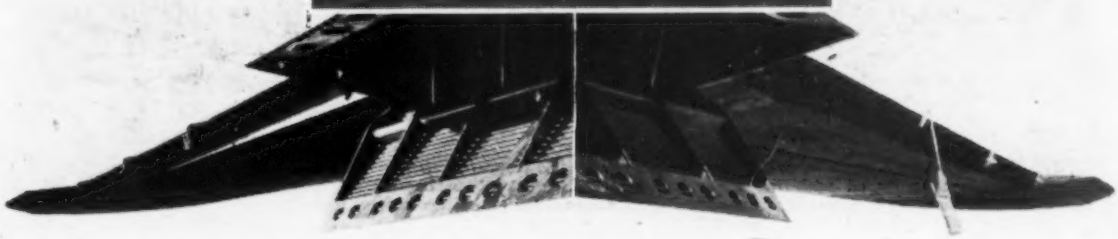
In a recent message to Air Chief Marshal Sir Sholto Douglas, Air Officer Commanding-in-Chief, Coastal Command, Sir Bertram H. Ramsey, K.C.B., K.B.E., Allied Naval Commander - in - Chief, Expeditionary Forces, said that the Command's anti-shipping operation "must have added a further unwelcome burden to the enemy's already overloaded transport systems, while your aircraft so harried the enemy's coastal forces that they did not inflict the damage to our convoys which might otherwise have been expected."

Mr. Churchill also sent Sir Sholto a congratulatory message.

Bomber Command, which dropped a record total of 65,000 tons during 30 days and 26 nights of August, also did a particularly useful piece of work in the "discouragement" of the Huns bottled up in Brest, when Lancasters carried out an afternoon attack on the uncompleted French battleship *Clemenceau*, in the harbour. This effectively scotched any idea they may have had of moving the vessel and sinking it in the entrance of the Rade Abri.



BALLISTICS GONE WRONG. The business end of a rocket-driven bomb, presumably launched from Peenemünde, which landed at Bäckebo in Sweden. The Swedes report that it was radio controlled.



LATERAL INSTABILITY: A Lancaster which recently came home minus both ailerons. The photographs below are close-ups of the gaps left on the port and starboard wings.

HERE AND THERE

Change of Name

AS from August 10th, the name of the Fane Aircraft Co., Ltd., has been changed to Fane Engineering Designs, Ltd.

Appointment

MR. J. D. BEDDOWS, B.Sc., has been appointed metallurgist and technical assistant to Dr. E. G. West, of the Wrought Light Alloys Development Association. He graduated at Birmingham University in 1931.

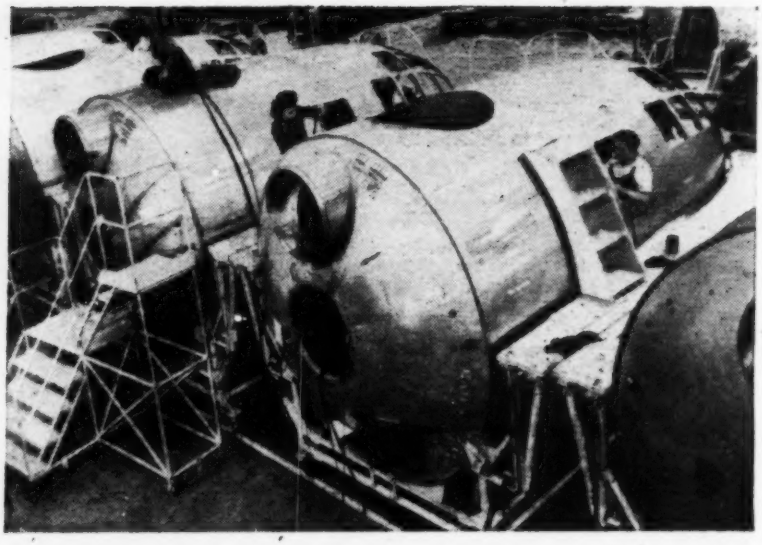
Swiss Air Mail Suspended

THE air mail service to Switzerland has been temporarily suspended owing to conditions on the Continent, the Postmaster-General announces. Surface correspondence for Switzerland is still being accepted but is subject to delay.

Coming Event

A LUNCHEON and film show for those interested in motor racing is to be held under the chairmanship of Capt. G. E. T. Eyston at the Rembrandt Hotel, South Kensington, on Sunday, September 17th, which is "Battle of Britain" Sunday.

Proceeds will be in aid of the R.A.F. Benevolent Fund, and tickets are obtainable from Mr. A. F. Fletcher, 4, Eversleigh Road, New Barnet, Herts.



HIGH OFFICE: Pressurised compartments of the B-29 are built as separate units. Here is the forward control cabin under construction. The hole near the top connects by a tunnel to the gunners' quarters amidships.

Mercury 1944

A TWICE-DAILY Press service has been flown by three Hurricane pilots in and out of Paris since that city was liberated, to bring war correspondents' despatches to London.

Flt. Lt. "Chippy" Barclay, of Margaretting, Essex, the leader of the "Press Flight," was actually the first Englishman to land in Paris.

Birthday Party

MAJOR J. R. McCRINDLE, Deputy Director-General of B.O.A.C., who is on tour overseas, presided over a dinner in Cairo on August 25th to celebrate the 25th anniversary of British civil aviation.

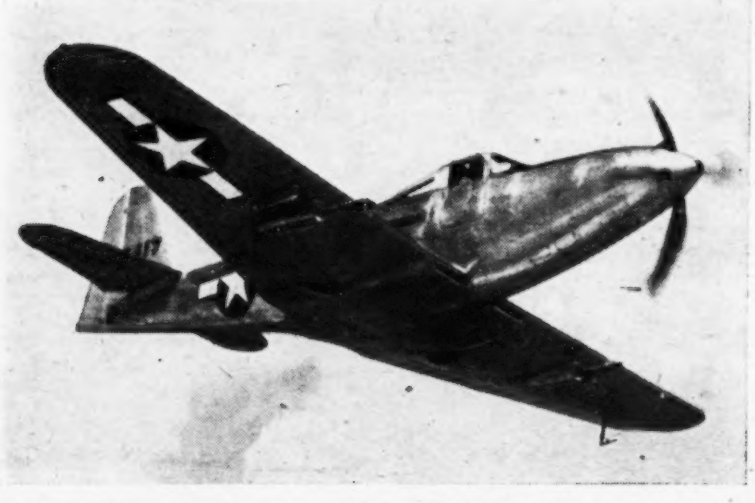
Hanworth Airport Deal

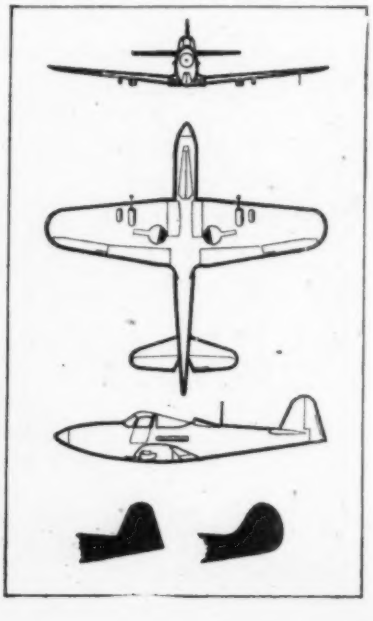
LONDON AIR SYNDICATE, LTD., a subsidiary of Blackburn Aircraft, Ltd., has exercised its option to purchase Hanworth Airport for £100,000. Part of the purchase money will be loaned to the syndicate by the parent company.

Jerry "Squirts"

FIRST mention of the Messerschmitt Me 262 jet-propelled fighter was made in the news last week by a Press Association correspondent, who described it as a heavily armed single-seater fighter with two power units.

One of these new German "squirt jobs" was encountered by a couple of Thunderbolt pilots and was flying at a low level. The two Americans dived on it and forced the Nazi pilot to crash-





FLYING FANGS: The Kingcobra (P-63) long-range fighter has improved speed, ceiling and range compared with the Airacobra from which it is developed. Armament comprises 37 mm. cannon and four 0·5in. machine guns. Airacobra tail is shown (extreme right) for easy recognition.

HERE AND THERE

land. They then set it ablaze with their machine guns.

The same correspondent refers to the previously encountered new type, the Me 163, which he describes as a modernistic "flying wing" design propelled by a single rocket unit and used for short range duties. "Its speed over very short distances is extremely high," he adds.

Scandinavian Plans

THE Swedish Inter-Continental Air Traffic Corporation has lodged an application with the American State Department and the Canadian and Icelandic Governments to operate a Stockholm-New York air service via Iceland and Labrador.

The Danish Airlines Company has made a similar application and it is believed that the Norwegian Government in London will follow suit. The applications are the first step in realising a plan to operate an all-Scandinavian trans-atlantic service, first discussed by the Danish, Norwegian and Swedish air experts before the war, but which were interrupted by hostilities.

Authoritative Denial

AMERICAN AVIATION says that U.S. Government circles deny report that Mr. Adolf Berle, Assistant Secretary of State, promised Lord Beaverbrook that the U.S. would supply adequate numbers of aircraft to Britain after the war without making any charge for them.

"The British never even suggested this," says the report, "and always suggested that they would purchase the aircraft they needed after the war."

Recognition from U.S.

SOME weeks ago we were happy to quote a New York newspaper which has Anglo-American relationships so genuinely at heart that it gave full credit to Britain's part in the development of the Mustang.

We are now even more gratified to read that President Roosevelt, in a letter to Congress with his 16th report on Lend-Lease, reminds his fellow-countrymen that "Rockets" based on a British design are now being used by American forces against the Japanese in the Pacific; a British-developed radio set has been widely used in American tanks built for Britain and Russia; and that the (Bell) jet-propulsion plane uses an engine based on the Whittle design developed in Britain."

Thank you, Mr. President.

India Looks to the U.S.

SIR GURUNATH BEWOOR, Secretary to the Government of India Posts and Air Department, who is now in America with a delegation to discuss civil aviation, said in a recent interview with the U.S. Press that commercial expansion through air routes would bring the two countries together to a hitherto undreamed extent.

He expressed himself as well pleased with the progress made in the preliminary international talks on post-war civil aviation with Mr. Adolf Berle, U.S. Assistant Secretary of State, and said they were agreed on the development of air services for the common benefit of all the peoples of the world.

"Our sole aim is to increase greatly the living standards of India's 400 millions," he added, "and we need America's technical and scientific help to do it."

GOOD SHOW! Col. David Stirling, who, with Lt. Jock Lewis, originated the Special Air Service, greeting a patrol on its return from behind the enemy lines during the North African campaign. The S.A.S., news of which has only just been released, has been operating behind the lines in France with telling effect.

Tight Take-off

PIPER CUB liaison and artillery aircraft—popularly known as Grasshoppers—are being flown from tank landing craft and proved particularly effective in the Mediterranean landing operations.

This was disclosed last week by Mr. James Forestal, U.S. Navy Secretary, at a Press Conference. Never before, he said, had such comparatively small craft as landing barges been used to launch aircraft.

"Now will yuh come up?"

U.S. Air Traffic Record

A NEW record for the Air Transport Command of the U.S.A.A.F. was created last week when the 10,000th aircraft since January 1st landed at an A.T.C. base in Britain.

Ferried aircraft formed a large proportion, in addition to a greatly increased number of transports, but the evacuation programme for American wounded, more than 6,000 of whom have been flown home to the U.S. since D-Day, has helped to swell this total, which is nearly four times that for the same period of 1943.

News!

CENSORS being what they are, it is fully appreciated that those responsible for compiling the "stories" sent out by the Air Ministry News Service are by no means given a free hand. In fact, they may possibly have to be even more guarded than the professional Press, for obvious reasons.

There is a saying, in fact, that our censors never release anything until they have seen it in the newspapers.

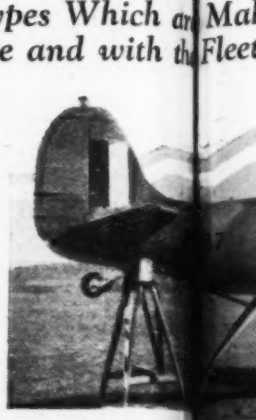
This job of trying to make omelettes without eggs results in the dishing-out of uninformative statements such as "More mines were dropped by R.A.F. Bomber Command during the last three months than in any previous quarter since the war began," and the hardly surprising announcement that "weeks before the invasion, Bomber Command laid mines where they would be most likely to interfere with the enemy's submarines."

Only one concrete fact was contained in the news story from which the above quotations are taken—namely, that Bomber Command flew nearly 2,000,000 miles during that quarter as compared with the previous highest figure of nearly 1,500,000 miles. That *does* tell us something.

D

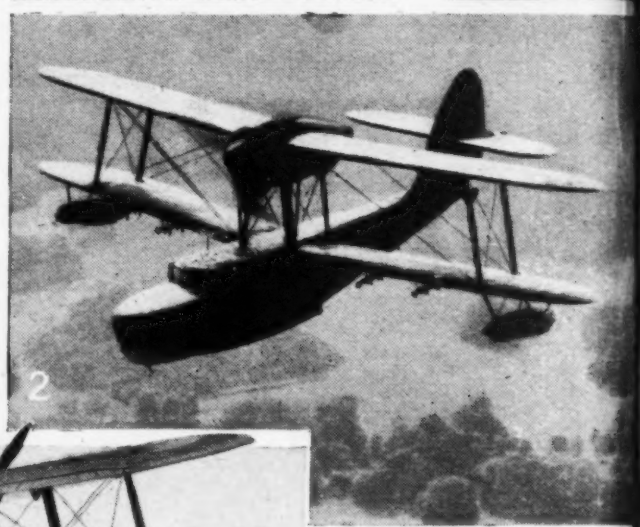
Sea Otter a

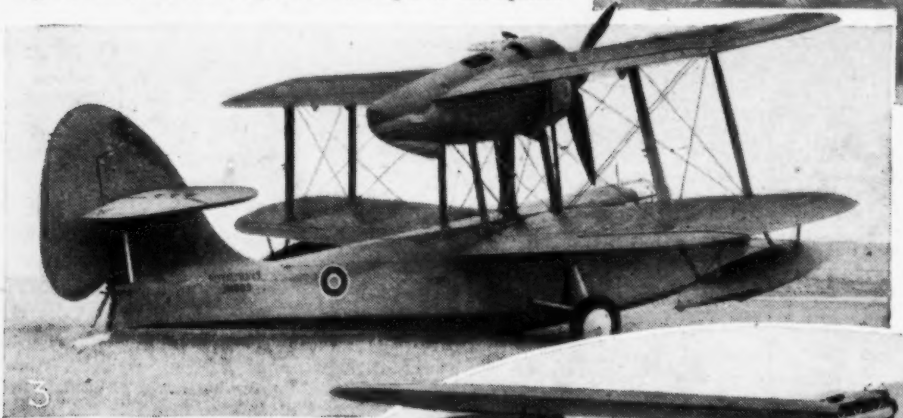
Two Supermarine Types Which ar Mal Service and with th Fleet



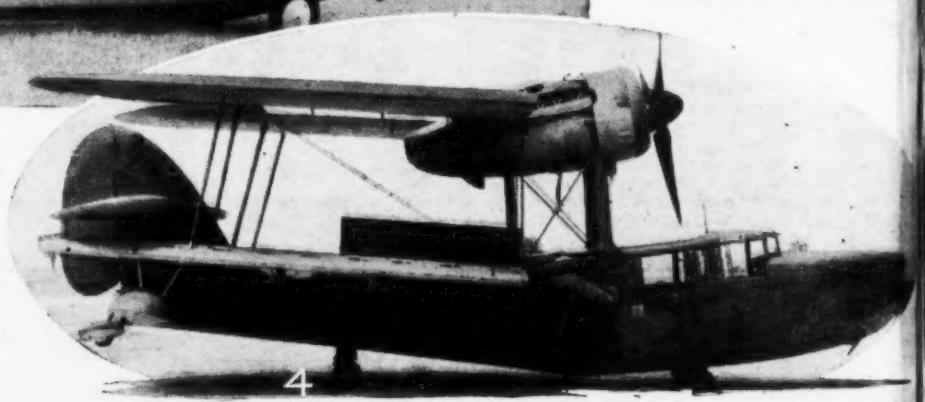
FROM its early beginnings in 1913 or so, the name Supermarine has been associated with the sea. Flying boats, either plain or amphibian, made the name famous. In the present war the firm has made an even greater name for itself with Mitchell's Spitfire, a fighter which has achieved world renown, and which has so far figured in the war news in no fewer than 30 different variations. That is not necessarily the limits of its adaptability and development, but it is all that has been announced so far.

This week we are able to illustrate and describe two Supermarine types not previously disclosed, although neither can be regarded as *new*, both having been in service for some considerable time. They are the Sea Otter Mark I and the Seafire Mark III. Both retain the connection with the sea in that the Sea Otter is an amphibian developed from the Walrus, which has done such wonderful work in the Air/Sea Rescue Service, and the Seafire Mark III, a carrier-borne single-seater fighter developed from the Spitfire Mark Vc. Seafires IA, IB and II have been illustrated previously. The IA was developed from the Spitfire Mark VB with Rolls-Royce Merlin XLV engine, while the Mark IB, owed its origin to the Spitfire





Figs. 1 and 2 show the Supermarine Seat Otter amphibian flying boat taking off and flying. The machine is a development of the famous Walrus, which has done such excellent work in the Air-Sea Rescue Service. The most obvious difference between the two is the "turning around" of the engine, converting it into a tractor installation.



The Sea Otter, Mark I, is shown in 3 and 4 resting on its land undercarriage with wings spread and folded. By substituting a tractor power unit, Supermarines have reverted to earlier practice of years ago, when the Seagull single-engined amphibian with wooden hull had this engine arrangement. Presumably engine cooling is improved by placing the Bristol Mercury XXX in front, a feature which is of importance when the machine has to taxy long distances

r and Seafire

h ar Making History in the Air/Sea Rescue
h th Fleet Air Arm Respectively

The Seafire, Mark III, is the latest version of the original Seafire, which in turn was a development of the Spitfire Mark VB. It is shown in various attitudes in Figs. 5–8, the most noteworthy feature being the folding of the wings, necessitated by the fact that the machine operates from aircraft carriers.

While the Seafire IA was a carrier-borne version of the Spitfire VB., and the Mark IB was developed from the Spitfire VC, the Mark II owed its ancestry to the Spitfire IX. The Mark III Seafire is a descendant of the Spitfire VC, the engine of which was a Rolls-Royce Merlin XLV of some 1,300 h.p. It has the same armament of two 20 mm. cannon and four .303 machine guns, or of four 20 mm. cannon. The Spitfire VC has a speed of about 370 m.p.h., at low altitudes. Arrester hook and catapult spools are part of the normal equipment of the Seafire III.

SEA OTTER AND SEAFIRE

Vc. The Seafire II, on the other hand, hails from the Spitfire IX and has a Merlin LXI.

In external appearance the Sea Otter Mark I resembles closely the Walrus except for the fact that the Bristol Mercury XXX drives a Rotol three-bladed tractor airscrew in place of the pusher of the Walrus. There are, however, other differences not obvious from the photographs. For instance, the lines of the boat hull have been altered considerably, with the result that the hydrodynamic performance has been improved. This is of very considerable importance in view of the fact that on air/sea rescue work it sometimes happened that the good old Walrus had picked up a greater load of aircrews than could be taken off in a rough sea. Time after time one has read reports to the effect that the Walrus was too heavily loaded to get off, and that it taxied for miles to the nearest safe port. With the Sea Otter this should not be necessary so often since its lines are such as to enable it to get off with a greater overload.

It is, however, not only the hydrodynamic but also the aerodynamic design which has been improved, with the result that the Sea Otter will not only get off with a greater overload than that of the Walrus, but once in the air its performance is better. That may be very important if any of the rescued aircrew has sustained injuries. Furthermore, the improvement in aerodynamic shape has resulted in almost doubling the flying range, a fact which adds further to the already great usefulness of this class of aircraft.

The Mercury XXX engine drives a Rotol three-bladed constant-speed airscrew. The main planes are arranged to fold, and the undercarriage is retractable. The crew of three is accommodated on the port side of the hull. Two gun positions are provided, one in the bow forward of the pilot's cockpit, and the other aft of the W/T operator's station. The hull is of all-metal construction, and its interior is reached through the hinged cover at the rear gun position.

Top and bottom main planes have equal span and chord; they are braced by struts and streamline wires, and are folded back by means of hinges at the rear spar joints. The basic structure is of stainless steel and the lighter components of spruce, the whole being fabric covered. The tips of the bottom planes are fitted with floats.

The undercarriage is hydraulically operated. It consists of two main wheel units which retract upwards and outwards into special recesses in the bottom planes. The rudder and elevator are constructed of fabric-covered metal spars and wooden ribs, whilst resin-impregnated three-ply is used to cover the tailplane.

Armament comprises three Vickers 303 "K" guns, and bombs or depth charges are carried on two universal carriers on each bottom plane. Marine equipment, including anchor, dinghy and emergency equipment, are stowed in easily accessible positions within the hull.

Supermarine Seafire III

The Seafire III is a development of the Spitfire Mark Vc. Basically the Seafire follows closely the general construction of the Mark Vc as to engine, armament, etc., but certain important modifications were essential to render the machines capable of operating from aircraft carriers. Provision had to be made for the fitment of an arrester hook, which is lowered by the pilot on landing to engage wires stretched across the deck, and the machine is thus brought to a standstill. Catapult spools were also fitted, and to enable an adequate number of these machines to operate from a limited space, the wings of the aircraft had to be made so that they would fold, thus reducing the span to just over one-third that of the standard Spitfire. The wing has been made to lift vertically towards the fuselage by the provision of hinges near the root, but outboard of the radiator. The second fold, situated at the wing tip joint, turns downwards in the opposite direction.

MAIN DATA OF THE NEW TYPES.

	Sea Otter I.	Seafire III.
Span (ft. in.)	46 0	36 8
Length (ft. in.) ..	39 5	30 0
Height (ft. in.)...	16 2	8 0
Wing Area (sq. ft.)	610	242
Loaded weight (lb.)	10,000 (approx.)	7,000 (approx.).
Engine and h.p...	Mercury XXX 870	Merlin XLV 1,470
Airscrew	Rotol 3-bladed	Rotol 4-bladed

NAVAL FIGHTER-BOMBERS: Bombing up Wildcats on the flight deck of H.M.S. *Pursuer* for the Allied invasion of Southern France.

MOSQUITO Fighter-Bombers

The Work of Our Fastest Twin-engined Fighter-Bombers Which Harass the Germans by Day and Night

From Our Own Correspondent at S.H.A.E.F.

MANY of the prisoners captured in the Falaise pocket and in subsequent operations have said that our night fighter-bomber patrols were the worst part of all the fighting. This is easily understandable if one goes to one of the stations which operate these patrols and sees the quality of work put in to make the patrols as effective as possible. Hundreds are flown every night in all weathers, and much useful work is done.

It is impossible to go on ops. with these boys because the Mosquito only carries two—pilot and navigator—and there is no place at all where a third person could be tucked away. However, having flown in one of the Mosquitoes during a night-flying test, and having had a very detailed description of a typical operation from a wing commander who has done many of them, I think I can reconstruct the picture fairly faithfully.

Aircrews who have flown the night before generally put in an appearance again round about 2 p.m. in readiness for another night's work. These boys fly quite a number of ops. in a short while—two in a night is quite common. When some very special target, such as the Falaise pocket, is being attacked, as many as three trips to the battle area are made during the hours of darkness. This is a very great tribute to the aircrews, to the ground crews for a quick turn-round, and to the Mosquito for its speed.

During the early evening the night's work for the Wing comes in from Group H.Q., and a conference is held to allocate the tasks. This conference is attended by the Station Commander, Group Capt. L. W. C. Bower, D.F.C., Wing Cdr. Intelligence, Wing Cdr. Flying, an Air Liaison Officer and the squadron commanders. In addition to these, specialist officers—armourer, engineer, meteorological and flying control—will attend to obtain a clear picture of the night's work.

According to the distance away of the target areas, orders will be given for long-range tanks to be fitted or removed. The armament officer will decide what load is to be carried and the types of bombs, flares and illuminating cartridges to be used. "Met." gives a picture of what the weather will be, both at home and over the target, during the

Ground crews of a Polish squadron prepare one of their Mosquitoes for operations.

MOSQUITO FIGHTER-BOMBERS

whole night. Flying Control decides which runway will be used and the compass bearing of that runway. Later the individual crews are briefed. Pilots and navigators assemble in the squadron crewroom, and the squadron commander reads out the names of the crews and chalks on the board their take-off time and time over the target.

Next, the actual routes of the patrols are given and also the heights and routes by which the Mosquitoes fly to and return from the target areas. The Air Liaison Officer then gives a general picture of the progress of the battle, with special stress on the effect of the patrols which are just going to be flown. On the night I was there the crews were given the railways in the Lille, Cambrai, Montdidier, Amiens area to watch for trains taking supplies to the battle area and taking flying bombs to the launching sites. Many of the crews reported a blank, but a train, believed to be carrying flying bombs, was attacked and destroyed. Even the negative reconnaissance is useful because it fre-

A low-level attack with cannon, machine-guns and bombs on a train. This photograph, taken through the bullet-proof windscreen, gives the navigator's view of the attack.

(Left.) Pilots and navigators in the crew room waiting for briefing to begin. (Centre.) A pilot signs for his Mosquito before getting on board. (Right.) A pilot and his navigator seated in the cockpit. The reflector sight projects from the dashboard.

quently ties up with earlier operations farther to the rear and shows their effectiveness.

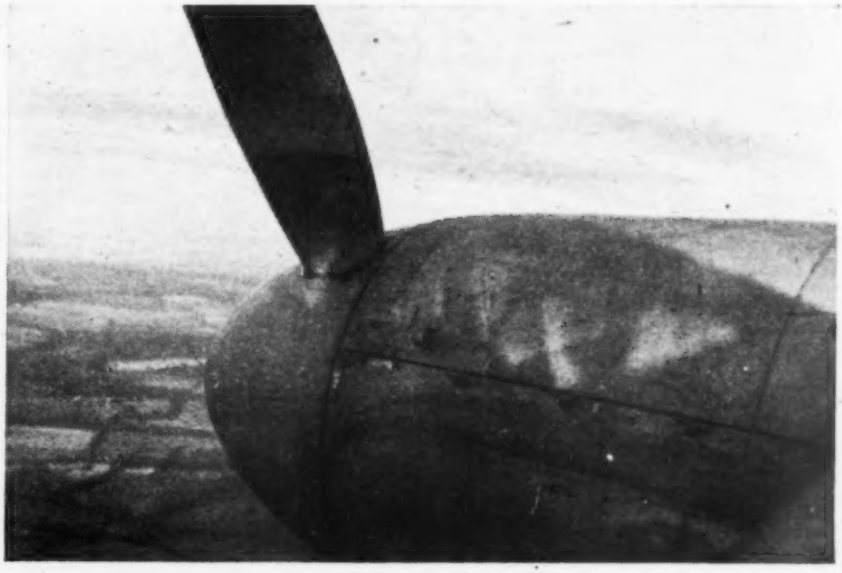
Finally, the Intelligence Officer gives details of flak patches and of such friendly aircraft as will be working in the vicinity of the patrols. For the old hands this is the end of the briefing. The squadron commander, however, takes new crews on one side and, out of the wealth of his experience, tells them how to do the job most effectively at the least possible risk to themselves. He goes over all the briefing again, patiently enlarging on all the salient points—the effect of autumn mist on flares—other airfields at which to land if home base is foggy—how to tackle a train with flak wagons—the evasion of flak and searchlights—enemy night-fighter tactics when bombing under parachute flares. He reminds them to watch length of patrol and petrol consumption carefully, and finally tells them not to be greedy over any "joy" they might find but to make their attack and get out of the way after calling up others.

Out on the airfield the air crews make a thorough check of their aircraft. Bombs, guns, flares and anything else which has been fitted since the night-flying test was carried out, are carefully gone over.

As each take-off time approaches, the pilot and navigator concerned leave their midnight operational breakfast of bacon, eggs and chips and go to their Mosquito at the dispersal point. Flying gear is put on and they settle comfortably in the restricted but not cramped cockpit. Oxygen and V.H.F. radio are connected, and the oxygen is turned on to the equivalent of 10,000-15,000ft. This has been found a distinct help in keeping wakeful and helping night vision. The Mosquito crews carry a large supply and use it the whole time at whatever height they are flying.

Start-up

The Rolls-Royce Merlin XXIs are then started up—starboard first, then port—and left running at 1,200 r.p.m. While they are warming up, the trimming tabs are set. Elevator three-quarter division forward, rudder three-quarter division starboard, ailerons neutral. V.H.F. radio is switched on and altimeter set to read zero. With the engines warmed up to 40-50 degrees centigrade the radiator shutters are opened and the chocks signalled away by the flicking on and off of the navigation lights.



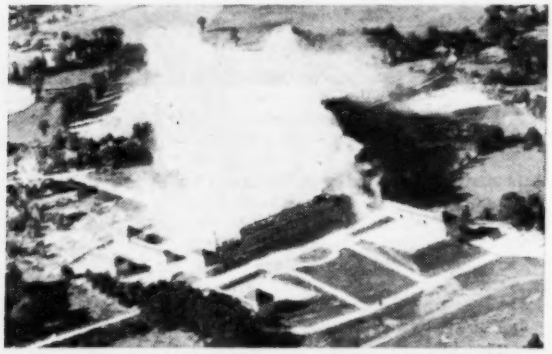
The confidence trick. Fly at 1,000ft. with one engine of the Mosquito stopped and the airscrew feathered.

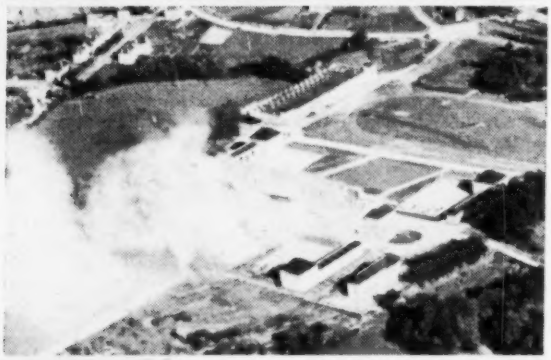
MOSQUITO FIGHTER-BOMBERS

Before the aircraft starts to move, Flying Control is called up on the radio and asked for permission to taxy. As the O.K. to taxy comes through the earphones one can see mentally the control officer take the stud with the aircraft's number on it from a panel marked "dispersals" and stick it in a rectangle marked "taxying."

Dispersal is frequently some way from the marshalling point, and as the aircraft taxies gently round the perimeter track there is time to listen to Control talking to other machines either in the air or on the ground. A picture is formed in the crews' minds of what other traffic is about. Another report to Control is made when the blue lights of the marshalling point are reached, and in Control the stud moves on again from the taxying square. Windows are closed and permission asked and given to move on to runway. The Control stud shifts again. With the present-day close cowling of engines, priority is given to aircraft waiting to take off because of possible overheating.

On the runway the Rolls engines are blipped up to 2,500 r.p.m. just to clear the plugs. There is no need to run them up. The reliability is such that if they were working perfectly at the time of the previous landing they are taken on trust to be still all right.





Three stages in the daylight attack by Mosquitoes on the German barracks in a technical school at Egletons.

For distant operations. Screwing up the central fitting of a long-range tank under the starboard wing.

Friction throttle-control dampers are tightened, gyro compass is set to the bearing of the runway (this helps the pilot to keep from swinging during take-off on a bad night), the two engines are set to same speed, and the wing flaps lowered 12 to 15 degrees. All set; Control is called again and permission to "scramble" obtained. Brakes are released and throttles opened up—with a slight lead on the port engine to counteract any tendency to swing—until 3,000 r.p.m. is reached with plus 9 lb. reading on the boost gauge. A.S.I. showing 110-120 m.p.h., a slight easing back of the stick, and the machine is off. At this stage the pilot changes hands on the stick and selects "undercarriage up," but meanwhile the Mosquito is climbing only a very little for the next 20 or 30 seconds until 170 m.p.h., the minimum single-engine speed, is reached. At 500ft. the flaps are raised and the resulting nose-down attitude re-trimmed.

On Patrol

After climb to patrol height the Mosquito orbits until "set course" time arrives—usually one or two circuits is ample—then the radiator shutters are closed and course set with about 250 m.p.h. showing on the A.S.I., 2,400 r.p.m. on the rev counter and plus ½ lb. boost.

By now the eyes have become "dark accustomed" and the visual purple in them is at its maximum. Below, in all directions, can be seen coloured lights, flashing beacons, stationary searchlights and other signs which, to those who understand, represent an air force at war at night. Straight ahead the horizon can be sensed rather than seen. It is where the stars become dim and stop and nothing begins.

As the coast is passed the speed is stepped up considerably and the sky is searched continuously for enemy night fighters. A prominent feature of the enemy landscape from which to start work is pinpointed, and as the patrol area is approached other crews are heard calling Mosquitoes in the vicinity to share in any "joy" they have found. A number of lights is seen, but it is suspected that these are mostly French. The mentality of the Frenchman is such that it is impossible for him to keep a strict blackout. Down below, the railways are deserted, but a row of dim lights appears on a road. By the experienced Mosquito crew this is immediately interpreted as a road convoy and probably a very urgent one to be moving regardless of air attack. Bomb doors are opened and a cluster of flares dropped. Five seconds later a radius of half a mile is lit up, showing a road through a wood with vehicles passing along it. A diving attack is made with short bursts of fire from the four 20 mm. cannon and four .303in. machine guns until the bombs are released at the bottom of the dive. To avoid any flak or night fighters, evasive action is taken during which the impact of the

MOSQUITO FIGHTER-BOMBERS

(Top left.) Stripping covers ready for flying. With the exception of cockpit and engine covers, the Mosquitoes stand out in all weathers with no protection. (Top right.) Bombing-up the port wing rack with a 500-lb. bomb by the aid of a pair of "hockey sticks." (Centre left.) An armourer re-arms the four machine-guns in the nose. (Centre right.) Filling the oxygen bottles in the fuselage. A six-hour supply is carried. (Bottom left.) The telephone exchange in the mobile control unit.

blast of the bombs is felt. A small fire is seen, and another cannon attack is made; the resulting fires show the target to be worthwhile. Other Mosquitoes are called *en clair* to join in the fun. While this is going on the flares lose height almost imperceptibly. In this very modern and complicated air war the earliest known method of flying is called in to help. The hot air rising from the flares supplies lift to the parachutes which support them. The Montgolfiers used this principle in their first successful ascents in hot-air balloons.

On the way home a wise pilot flies gently. While engine damage is self-evident, it is impossible to know what flak damage the airframe has sustained.

As Britain's coast is crossed again, that lovely feeling of being back home is felt. Searchlights and shadows are no longer sinister. Control is called and, after it has been given the aircraft's call sign, is told "feet are dry" to let them know that the machine is over the Channel safely. Barometric pressure is given to reset the altimeter. Height at which to orbit the airfield is also given, and while waiting for instructions to "pancake" a picture of the aircraft in the locality can again be obtained by listening to the Control Officer despatching and landing them.

MOSQUITO FIGHTER-BOMBERS

(Above.) A Control Officer in the conning tower of the mobile unit. He is talking to aircraft at the dispersal points which are asking for permission to taxy.

(Below.) In field conditions, airfield control is carried out from a mobile unit. While it is not as convenient as the static control room, a considerable volume of traffic can be handled.

When next in turn to land, speed is reduced to 180 m.p.h. and the undercarriage lowered. This is checked twice to make certain that the tail wheel is down. Flaps are put down 30 deg. during a cross-wind approach, with speed down to 150 m.p.h., and fully down as a final turn is made into the runway funnels. Engines are revved up to 2,850 r.p.m. in fine pitch and throttled right back as the coloured lights of the glide-path indicator are approached. A slight scrape is heard as the touch-down is made at about 115 m.p.h. because the wheels refuse to accelerate instantaneously. A series of hisses occur as the compressed air is used to operate the brakes to avoid swing and to pull up the Mosquito. It comes to a standstill and then taxies off the runway. Immediately Control is called and "runway clear" is given, as well as "good night," plus any little pleasantry appropriate to the moment.

At the dispersal point the oxygen and V.H.F. radio is switched off and the engines stopped by the aid of the cut-outs. The ground crew are eager to know if everything was all right and to hear of the night's work.

Interrogation

Transport takes the crew to the briefing room, where the flight will be discussed in detail. Down each side of the marquee are tables and chairs, cigarettes and hot tea with a lacing of rum. Each table has an Interrogating Officer, and a crew coming in goes to any vacant table. At one end of the tables is another table at which the chief Intelligence Officer sits. All the reports are passed to him and co-ordinated by him into a comprehensive report to Group. If there is something requiring urgent attention, Group is, of course, told straightway. These interrogating officers need to be good psychologists, and from just this point of view it is interesting to watch them at work. Some crews have to have every comment dragged out of them by leading questions; others "shoot an imperial line" and have to be curbed. The most difficult of all are those who say that nothing very much has happened and then just casually mention some terrific job of work they have done.

It must not be thought that all the flying is done at night. Actually this is quite a recent innovation, and low-level attacks by day are still being made. It was an inspiration to hear a French crew describe a recent attack on a suspected Gestapo H.Q. They were the only French crew in the Wing. René was an Armée de l'air pilot of 15 years' experience, and Jacque, his navigator, a student in Paris. The target was at Egletons, 50 miles south-east of Limoges. In it were a number of Germans surrounded by the Maquis. Bombing had to be accurate because the Maquis were within rifle-shot distance. According to these two French lads, it was *very* accurate. They saw the bombs from the Mosquito in front of them go straight in through the front door and, knowing that their own bombs were in formation with them, presumed that they entered close by. Out of 14 aircraft one was lost by a stray machine-gun bullet. Shortly afterwards came the message from the Maquis, "Many thanks for magnificent bombing."

The other week this Wing celebrated their 2,000th sortie since D-Day. This has meant very hard work by the aircrews; often two, and occasionally three, journeys were made in a night. It is, however, an equal tribute to the ground crews and aircraft that such pressure can be maintained. It would not be possible at all if the majority of the flying had to be done by day. As it is, the Mosquitoes fly by night and are serviced by day. Although the flying hours are 200 per cent. over the pre-invasion figures, yet serviceability is still well over 95 per cent. of the aircraft on charge. The wooden airframes stand up to all weathers with no cover, in a manner quite equal to metal aircraft, and their only drawback is the time taken to do a glued repair.

A "BLACKBURN" SCHOLARSHIP

MR. ROBERT BLACKBURN, chairman of Blackburn Aircraft, Ltd., has undertaken to award a £100 annual scholarship to the apprentice who achieves the best results in the examinations for the ordinary National Certificate in mechanical engineering.

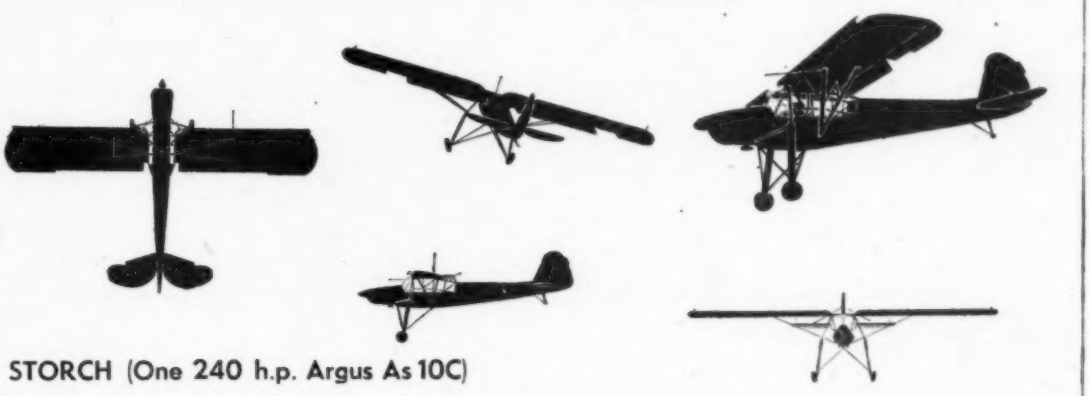
This offer is only open to those who take the course for the diploma in aeronautics at University College, Hull, and the first award will be made this year on the results of the examinations already held. Trade and engineer apprentices at any of the company's works are eligible.

This generous offer by Mr. Blackburn is further evidence of the increasing interest taken by the industry in the technical training of youth. The Society of British Aircraft Constructors has had in being for many years a scheme for the encouragement of boys whose parents are in financial circumstances that would otherwise debar them from following their chosen career.

Recently the de Havilland company announced details of a comprehensive education scheme for youth aeronautical training, whilst Westland Aircraft have a scheme leading ultimately to a university course at Cambridge.

Studies in Recognition

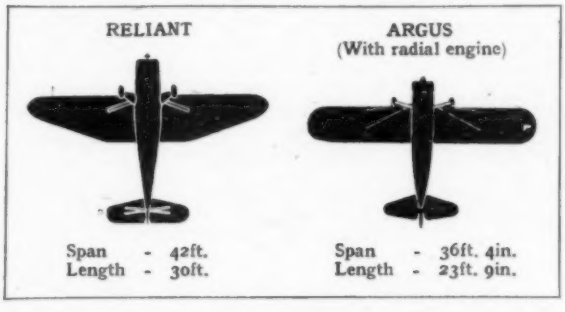
Aircraft in Flying Attitudes



STORCH (One 240 h.p. Argus As 10C)

FROM the functional point of view the Fieseler Storch is comparable to the British Auster and the American Piper inasmuch as it was designed to fulfil duties calling for a quick, short take-off and a slow, short landing in and out of small spaces. But it does not fulfil them with anything like the economy of the light Allied types which are military versions of popular private-owner and club aircraft. For the Storch is comparable in the matter of size and engine power with such Allied aircraft as the Fairchild Argus and Stinson Reliant, which are illustrated here by way of comparison.

Usually powered by a 240 h.p. Argus As 10C eight-cylinder inverted "V" type air-cooled engine, but occasionally encountered with other engines of similar size, the Storch has a top speed of only 108 m.p.h., but it is able to fly level at 31 m.p.h., land at 25 m.p.h., and stop in 30 yds. As will be seen from the illustrations, this aircraft has fixed slots along the entire leading edge of the strut-braced high wing, and slotted camber-changing flaps ensuring a remarkably short take-off run. This last feature enabled a Storch



pilot to rescue Mussolini from his mountain jail. The type was also extensively used in North Africa to taxi German generals, including Rommel, around their commands, and Mr. Churchill used a captured Storch on a recent tour of the Normandy front and was piloted by Air Vice-Marshal Harry Broadhurst, a group commander in the A.E.A.F.

Incidentally, its name (in English, Stork) is obviously inspired by the long, slender legs of its fixed undercarriage braced to the upper longerons of the fuselage at the wing-roots. This unusual undercarriage constitutes a major recognition feature. Other distinctive points include the very slim fuselage aft of the cabin, which bulges at the sides to provide adequate elbow room (especially for Mussolini!), the very large curved elevators which project well beyond the tips of the fixed horizontal surfaces, and the large fin and rudder with curved trailing edge and horn balance.

It is worth noting that the peculiar shape of the nose, which roughly follows the cross-section of the inverted V engine, gives it the appearance of a small radial in the underneath plan view. This is of some importance when comparing the Storch with the Fairchild Argus—the C-61 in the U.S.A.A.F.—because the latter, which also has parallel edged wings and a fixed undercarriage braced to the upper fuselage longerons at the wing roots, is now produced with either radial or in-line engine as illustrated. The far more

Fieseler Storch.

Fairchild Argus (in-line Ranger engine).

Stinson Reliant.

compact lines of the C-61, however, should prevent confusion, while in the case of the Reliant the cantilever undercarriage and "Lysander" wing form are quite distinctive. Like the Argus, the Reliant has a fuselage of much greater cross-section in relation to its length than has the Storch, while its comparatively heavy, blunt nose could not house anything but a radial engine.

Dimensions of the Storch are:—Span 46ft. 9in., length 32ft. 6in., height 10ft., wing area 279.7 sq. ft

"Indicator" Discusses Topics of the Day

Private Ownership or Public Hire?

The Future of the Private Pilot : Ownership as a Financial Risk and Burden : Big Prospects for a Full-scale Aircraft Hire System : Flying Yourself and Driving Yourself : Keeping Reserve Pilots in Practice

AT about this stage in any major war, when the end can be seen as a reasonable possibility, people always begin to talk openly and fairly happily about the world that peace will eventually bring. And even the average person, who has no particular interest in flying as such, looks forward (with pain or enthusiasm according to his views) to a world in which civil flying will play a progressively bigger part.

Of course, people had much the same ideas at the end of the last war, and this self-same "average person" has little idea of the technical and financial difficulties which are still facing the airline operator. Perhaps that is just as well, because the world will be ruled by the feelings and desires of the mass, just as it always has been ruled, in the aggregate, for hundreds of years, and things will be done whatever the difficulties and whatever the cost.

Among the more knowledgeable people are many who see an extraordinarily bright future of cheap air travel and casual aircraft ownership, and those who, at the other extreme, see the cost remaining much as before in both public and private aircraft operation. I try to take a middle view, with a leaning towards pessimism—particularly where mass private ownership is concerned.

Not Comparable with Cars

There are a few simple reasons why aircraft have not been, probably never will be, owned by the mass of people in the way in which cars are owned. Among those reasons are not the obvious ones of initial cost and running costs of the more immediate kind; I see no reason why both those costs shouldn't be comparatively low, provided that the market is sufficiently big. No, the real reasons are more of a technical and operational nature.

For the safety of all—and particularly of those persons still remaining on Mother Earth—a very high and internationally recognised standard of inspection and maintenance must be kept, and owner-pilots simply cannot be allowed, even in the freest of free worlds, to meander how and where they will in any weather. Any restrictive systems will involve enormous and high-class organisations which must somehow be paid for. I see no reason why a kind and generous government should provide such services free of charge, even though any necessary organisations for private owners will be merely an offshoot of the vast technical, inspectorial, airline control and meteorological system which must, in any case, be kept in motion for the benefit of the airline operators and the various R.A.F. Commands.

Let us even suppose that the government *are* generous and forethoughtful, and are happy to offer the services of their trained inspectors, flying control officers and meteorologists for a token sum of a few guineas a year. The A.I.D. inspector can still demand the replacement of my aircraft's main spar—at a cost of several hundred pounds—or the immediate overhaul of my aircraft engine by a recognised firm; the control officer can still order me to land at various points on the way to my destination; and the meteorologist can still virtually prevent me from flying at all during long periods in the English winter months. Knowing all this—and remembering particularly the possible costs of post-inspection overhauls—I shall think three or four times before, as an ordinary citizen, I shall consider the purchase of an aircraft exclusively for my own use. In fact, unless I have large resources, I shall not have the courage to do so.

But, with thousands of other pilots, I shall be very happy indeed to pay a flat rate for the hire of an aircraft whenever I happen to want one.

That, I feel absolutely certain, is the answer to the question, at least for the next decade or so. A really large firm, with its own overhaul workshops and a big fleet of all types of aircraft suitable for private hire, should be able to offer flying, hour-by-hour or day-by-day, at a very much lower figure than that which would have to be paid, over the whole year, by even the most energetically flying-conscious owner. Every machine in the fleet could be kept going under supervision for the maximum number of hours between overhauls, and the last, since they are being done in a big way, would not be particularly expensive.

I am not denying the very special pleasure of ownership, or the sometimes unsatisfactory feeling in flying some odd machine which one may never see again; and I am not denying the certainty that some people, living a long way from anywhere and with their own landing grounds, will still own their air cruisers. But I do know that for the mass of people a hire system is the only possible thing and will be the only way of keeping them happily and safely in the air. Furthermore, I know that a firm running such a business on a sufficiently large scale would suffer no shortage of customers and should be able to make quite a good thing of it even while retaining the necessary personal and happy touch.

The concern which I visualise would have aircraft available at all the more important airfields, and they would be flown to a centralised depôt for overhaul. At each centre instructors would be available to give the rusty veteran a few circuits and bumps, to ferry the aircraft when necessary to and from different points, and to act as mere chauffeurs when a hirer is not able, or does not feel the desire to fly himself. There would be a need, too, for flying schools to deal with those for whom any Air Force Reserve scheme has no use, but who may, nevertheless (and remembering the A.T.A.) be quite good and competent pilots in embryo.

Without Subsidy

I cannot feel that the Government will again attempt to subsidise all and sundry into the air as they did before this war, but it might be considered worth while to help the schools and the hiring system along—if only to ensure that the Reserve pilots are given a chance of flying in between their various training and refresher periods. That, and the insurance problems, are matters which do not concern us at the moment.

Knowing the uselessness of an aircraft after one has actually arrived at the airfield nearest to one's general destination, and knowing its uselessness, too, when the weather shuts down, my imaginary firm would also need to run a car drive-yourself hire system at each "branch," so that pilots and passengers could make the best of their business or pleasure stay in the district.

And now, of course, the whole gargantuan project is frightening me out of my wits. Like the average Englishman, I suffer from a fear and hatred of Big Business, while knowing, at the same time, that only a sufficiently large concern, at least in the flying world, can be made to produce cheap service for all. My imaginary firm simply *must* be a big one if it is to be any real use at all—though, of course, it needn't necessarily be all-in-one-piece. It could be a combine of individualist ventures, each working in healthy partnership with the others, or it could even be

PRIVATE OWNERSHIP OR PUBLIC HIRE?

a Government-sponsored affair and be almost as "official" as the Air Force itself—but run, I trust, at rather less cost to the taxpayer. That miserable fellow might even see a profit—thus taking money out of one pocket in order to put it in another.

Yes, maybe the Government had better control my firm, even if we obstinately refuse to let the Civil Service actually run it. The whole affair would be just a little too big and important to be in the hands of a few financiers—and I am afraid that the something-for-very-little breed will not be entirely extinct for quite a few generations.

Well, there it is. Whether Government- or Big-Business-owned is really of small importance so long as the hirers are pleased and get good value for money. All I can say again is that there will be no shortage of customers if it is started reasonably soon after the end of the war, and that the idea should be very much more pleasing to the powers-that-be than any *laissez-faire* muddle of general and haphazard ownership.

I look forward to a free week-end with the successor of the Moth Minor or Monarch as my fee for producing the suggestion and for reminding the prospective shareholders that the customers are waiting with their money actually in their hands.

INDICATOR.

Behind the Lines

Service and Industrial News from the Inside of Axis and Enemy-occupied Countries

Jap Chief

THE new chief of the Japanese Army Air Force is Lt. Gen. Sugawara, who succeeded Gen. Yun Ushiroku during the recent reshuffle of the Japanese Government.

Rescue

TWO hundred and fifty-two enemy airmen, says a German statement, have been saved during 1943 by the German Air-Sea Rescue Service.

Journey's End

COUNT VON BEROLDNINGEN, chief of the Lisbon branch of the *Lufthansa*, is back in Lisbon again after leaving on the last passenger aircraft last week and signing himself on as a "steward."

He was too late. The Maquis and the Americans were already then dominating the territory between Portugal and Southern Germany, and at Barcelona the *Lufthansa* aircraft had to turn back.

The count arrived back at the starting point of his journey discontented, this time having signed himself on as "aeronautical engineer."

Luftwaffe Aces

DESCRIBED by the German Telegraph Agency as the "best fighter pilot in the world," Lt. Erich Hartmann, a *Luftwaffe* squadron leader, and holder of the Oak Leaves with Swords, is credited with 301 victories. Twenty-two years of age, Hartmann is a son of a Wuerttemberg doctor, was an ardent member of the Hitler youth and spent some years in China. In 1940 he joined the *Luftwaffe* and has been on operational service for almost two years. He received the Knights Cross to the Iron Cross after having been credited with 146 victories, and the Swords Insignia after 202 air victories. Recently he became the eighth German fighter pilot and the tenth member of the *Luftwaffe* to receive the Diamonds, the highest German decoration for gallantry, following Moedlers, Galland, Marseille, Gollob, Novotny and the night-fighter pilot Lent. Hartmann is now serving on the Russian front.

The four most successful German fighter pilots in the Arctic theatre of war are said to be Oak Leaves holder Major Ehrler, Knights Cross holder Lt. Dorr, 2nd Lts. Schick and Nord. In announcing their names, the German News Agency says that they displayed great experience "in fighting against a frequently superior enemy."

Balance

ACCORDING to an official Rumanian statement, 14,000 buildings were destroyed by air attacks on Rumanian territory between April 4th and May 8th.

Hit

A TOKYO radio report picked up in New York made an appeal to workers for increased aircraft production.

"China-based aircraft have disturbed our war industries by raiding our homeland," the announcer said.

Decorated

GENERAL DER FLIEGER MAXIMILIAN RITTER VON POHL, commander of the *Luftwaffe* in Central Italy, was awarded the Knights Insignia to the Iron Cross. Col. Gen. Ritter von Greim, C.-in-C. of an air fleet, received the Oak Leaves with Swords, and General Kurt Pflugbeil, C.-in-C. of an air fleet, the Oak Leaves Insignia.

Berlin Picture

HERMAN MAARTENSSON, a Swede, who conducted an orchestra in the Europahaus in Berlin, and experienced all the large-scale attacks, has now returned to Sweden and said in an interview with the *Svenska Dagbladet*: "At present the main desire of Berliners is: 'Never mind if the food is worse; the main thing is that we are allowed to sleep in peace.'

"Berlin factories in the outlying districts suffered severe damage; for instance, the Erkner works in Oranienburg suffered badly in the last daylight attack. The Oranienburg aircraft factories are still working, but the Erkner ball-bearing factories have practically closed down, and it will be a long time before they are usable. Siemensstadt and some other industrial suburbs also suffered badly. The residential area in North Berlin between the Schönhauser Allee and Gesundbrunnen, which has no industries, is practically undamaged.

"As for *Stimmung*, everyone hopes for an improvement in the situation and an early end to the war—some even say irrespective of how the war ends. In particular, veterans from the last war desire an early peace or at least an end of the bombing so that they can sleep. The Hitler Youth is still happy and confident, and believes in victory and the righteousness of the German cause."

Maartensson has also been to western Germany, where damage is even greater.

Verboten

PRIVATE glider flying was banned under an order issued by Speer, German Armaments Minister, and the lead keels and lead ballasts of all gliders in Germany were requisitioned.

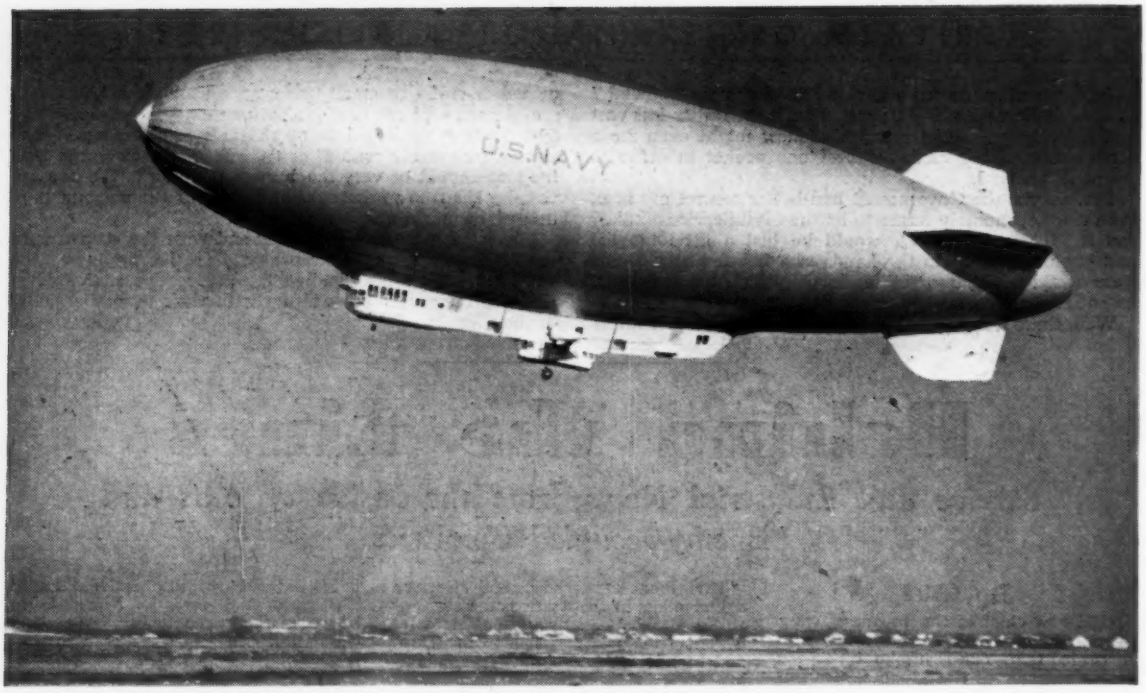
All owners of gliders must report to the authorities, and failure to do so involves the complete dismantling of machines, it was announced. Arrangements have been made for a vast resumption of peacetime gliding in Germany.

Me 209

ACCORDING to a neutral report, a new development of the Me 109, designated Me 209, is powered by a new 12-cylinder liquid-cooled in-line engine, said to be either a Daimler-Benz or a Junkers Jumo 213.

The aircraft is said to be equipped with several alternative armaments, one consisting of a 30 mm. cannon firing through the airscrew hub and two 13 mm. M.G.s mounted beneath the engine and synchronised to fire through the airscrew discs. Another version is reported to have two 30 mm. cannons in the wings and one 20 mm. cannon firing through the airscrew hub, whilst yet another consists of two 30 mm. cannons in the wings and two 13 mm. M.G.s synchronised to fire through the airscrew discs.

Incidentally, Capt. Robert S. Johnson, of the U.S.A.A., is credited with having shot down several of the Me 209s.



"The M.1. went through her trials with flying colours, and now it can be taken that this class will be adopted and put into commission." Note the length of the car compared with those of earlier models.

U.S. Naval Airships

In Spite of Early Setbacks, Notably Suffered by the Rigid Class, American Non-rigids Have Been Developed and Have Done Good Work in the Present War

By LORD VENTRY

WHEN the present war broke out the U.S. Navy had only one airship station in commission, that at Lakehurst, New Jersey, and it contained the following airships: The C-1, J-4, L-1 and the T.C-13-14. There was also the interesting metal-clad Z.MC-2, which had been in existence since 1929, and last but not least, the K-2. She was of 404,000 cu. ft. and a prototype of the present operational "K" class, which has done such good work against the U-boats. Further details will be found in the table at the end of this article.

These airships, then, made up the U.S. Navy fleet, but they were backed by five airships belonging to the Goodyear Company, who had kept the flag flying all through the often difficult inter-war years.

Now, some five years later, the U.S. Naval Airship Service has grown considerably, and the locations of at least eight stations have been published. Since then, other stations have been built, and, in addition, there are mooring-out bases. Finally, there are by now probably more than 100 airships in commission, many of which are operating off the Atlantic and Pacific coasts, the Gulf of Mexico, and the Caribbean Sea.

This vast increase is largely due to officers like Rear-Admiral Rosendahl, who have fought for airships in spite of all setbacks, and also to the good service record of the naval non-rigids in peacetime, and the excellence of the naval pilots.

Nor must the efforts of the Army be forgotten. For many years this service was mainly responsible for the development of the non-rigid and semi-rigid types of airship, the Navy concentrating rather more on rigids. The Army built a large airship station at Scottfield, Illinois, and from 1920 until 1937, when Congress refused them more funds, there was a continuous development programme. As time went on, the efficiency of this branch of the Service grew, and by the time the T.C-13 and 14 were handed over to the Navy, flights up to 76 hours in duration had been made. The Army also played a leading part in developing the technique of taking off under heavy load, like aircraft, by the use of runways, and in experimenting

THE author of this article is an airship enthusiast, probably almost the only one left in this country. His service career has been with the lighter-than-air side, and when he could not get airships he has been content with balloons. There is only one thing he prefers to hydrogen and that is helium.

That Lord Ventry's enthusiasm is sincere was demonstrated some years ago when he started a little journal called "Airships." It was a good little journal as such journals go, and as lighter-than-air aircraft go it went. He must have had to dig fairly deeply into his pocket before he was finally compelled to give up. But he is still a great believer in airships. In this article he admits it!

U.S. NAVAL AIRSHIPS

"The 'K' ships, successful as they have been, have re-emphasised the fact that with a medium-sized airship it is not possible to make full use of its powers of endurance."

with mooring masts and sub-cloud cars, etc. The names of the late General Westover and the present General Kepner, should be remembered when mentioning the Army's efforts.

Goodyear's Contribution

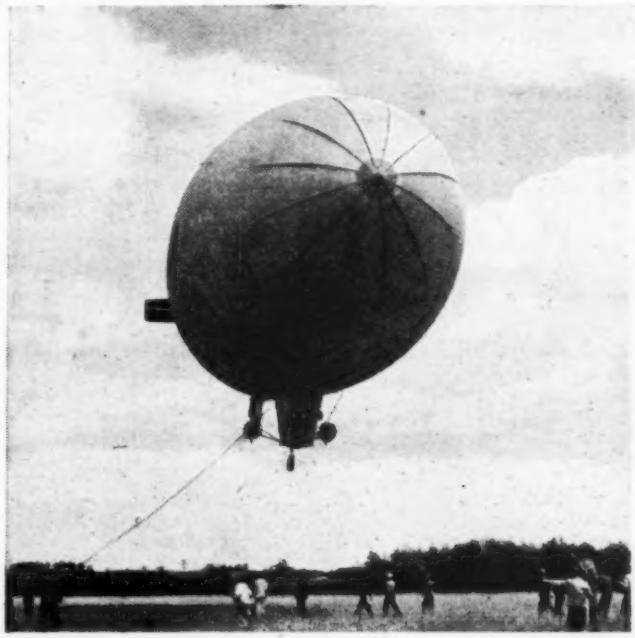
Another invaluable contribution to the airship cause was made by Goodyears under Mr. P. W. Litchfield, with Dr. K. Arnstein as the chief designer, and Karl Fickes as chief pilot. This firm, ever since the last war, has been developing non-rigids, and the present American K-class is the direct result of this enterprise. By January 1st, 1942, the Goodyear fleet of non-rigids had made 151,810 flights, flown for 92,965 hours, carried 405,526 passengers, and covered 4,183,470 miles, and not a single passenger even "scratched a finger" during all these operations. Goodyears also played a considerable part in the development of mast mooring, and by the time war broke out the airship *Enterprise*, based at Washington under Karl Lange and his clever team of pilots, had ridden out gales up to 70 miles per hour whilst so moored, without suffering harm. Goodyears also practised heavy take-offs, and it is now possible for airships to leave the ground with 1,200 lb. overload.

The U.S. Navy itself, assisted by an Austrian pilot, began experimenting in 1916 with the 150,000 cu. ft. A.I., which was not a very successful airship, but thanks to the good work of the British, French and Italian airships in anti-submarine work, the U.S. Navy did not give up, and in 1917 designed the B-class of 70,000 cu. ft., which corresponded more or less to our original S.S. of 1915. From then on, progress has been steady, each succeeding type of airship having been an improvement on its predecessor, so that by a natural process of evolution the present operational "K" and "M" classes of airships have arrived.

As a result of all this, the U.S. Navy has the advantage of the combined experience of the Army and Goodyears, not forgetting that of Great Britain and France. M. Juilliot, the French designer of the famous Lebaudy semi-rigid airships, also gave a hand by going to the U.S. in 1917 and assisting the Goodrich firm who were then building airships. Pilots were trained in Britain and France, and by 1918 British Zeros and Coastals, and French Astra, C.M., and Zodiac airships were going out on patrols with U.S. captains in charge. The French Naval airship station at Paimbœuf, near Brest, was eventually handed over to the Americans, who then had under their charge the T.2 *Capitaine Coussin*.

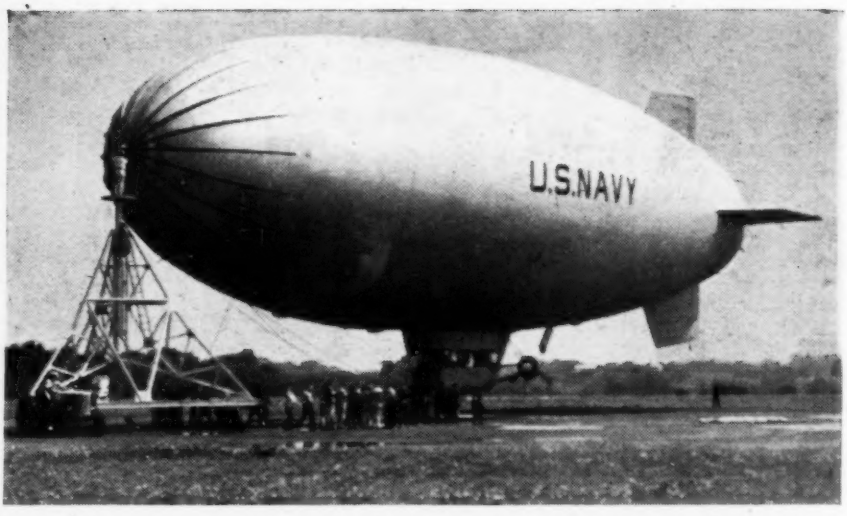
The experience then gained proved that the airship, provided that it was not working under the direct threat of hostile aircraft, could perform valuable work as an escort of surface craft, for it was, and is, the only aircraft which has (i) the necessary range to accompany a convoy for, if necessary, days on end; and (ii) the ability to regulate its speed to suit that of the ships it is escorting. Under these circumstances, then, it is more economical to use airships for this duty than the much faster heavier - than - air machine, which has to circle round, and so waste petrol, if it is not to leave far behind a convoy perhaps steaming at only 10 knots. Aircraft are best employed on offensive patrol, scouring the seas around a convoy, whilst the job of the airship is to guard the convoy itself, and watch areas where U-boats are believed to have submerged.

It should also be



The L.1 is a training type of 123,000 cu. ft. capacity.

U.S. NAVAL AIRSHIPS



Like the L type, the G type is a training ship. The capacity is 178,000 cu. ft. and the maximum speed about 63 m.p.h. All American airship stations are now equipped with transporter masts.

remembered that an airship's crew work under more comfortable conditions, and can therefore keep a better look-out. Also, it is easier to pick out small objects from the slow-moving airship, which has no wing to spoil the vision of the crew, than from a fast-moving heavier-than-air craft.

When the present war broke out, Lakehurst, commanded for a long period by Captain Mills, got busy, and the airships mentioned at the beginning of this article, to which should be added the K1, of 320,000 cu. ft., immediately began carrying out experimental patrols off the western seaboard. By this means, a large amount of data were accumulated, and valuable experiments were carried out with U.S. submarines. Month after month, this work went on, and the airships proved themselves to be very nearly all-weather flying craft. Facts began to speak for themselves, and by 1941 it was decreed that 200 airships should be put in commission and stations built on both seaboards. Thus was the efficiency and enthusiasm of the naval airship officers at last rewarded, and it was decided to concentrate on a slightly enlarged K-class for operation purposes, with the L and G class airships mainly for use as school ships.

The "K" ships, successful as they have been, however, have re-emphasised one important fact. That is, that with a medium-sized airship it is not possible to make full use of its powers of endurance, as the smallish crew of ten cannot keep an efficient look-out for more than a certain number of hours. Also, of course, there is the fact that when employed in hot climates, the lift falls. Thus a larger type was called for, and so the "M" class was born.

As can be seen from the photographs, all the previous ships had short cars slung right under the envelope, the ideal position, in fact, for head resistance is reduced to a minimum. This arrangement, by keeping the ship low, makes very high sheds unnecessary, ground handling easier, and raises the centre of thrust. Thus high speeds and excellent handling qualities have been gained, without a great increase of engine power, which, of course, means increased endurance.

Need for a Longer Car

When, however, the time came to produce the "M" type, it was not possible to perpetuate this design, for with a longer ship a short car would have put a big compression load on the envelope, unless such a car was slung at a very great distance below it, or an inordinately heavy envelope employed to allow a much higher internal pressure with concurrent loss of lift. Provision also had to be made for a larger crew, to work in watches; and for increased crew space to provide greater all-round comfort, so allowing longer patrols to be carried out.

The car itself is actually in three sections, joined together by flexible gangways. The M-1, which is of 625,000 cu. ft., with twin engines, went through her trials with flying colours, and now it can be taken that this class will be adopted and put into commission.

It is, unfortunately, impossible to give any details of present-day American airships or of their work, but a few indications can be given as to how some of the technical problems are being tackled.

Americans employ helium, which is very much more expensive than hydrogen, and it is, therefore, important to avoid useless loss of gas. Every hour an airship flies, it burns up so many pounds of fuel. In fact, a large non-rigid, at full throttle, might burn anything up to 200-300 lb. of fuel per hour. This means, then, that the airship will be lighter by this amount for every hour flown, and so a requisite amount of gas has to be exhausted to atmosphere when ballasting before landing.

Ballast from Water Recovery

In the case of the large rigid airship, this difficulty would be overcome by the employment of water-recovery apparatus, by means of which water is manufactured from the engine exhaust gases, so that the ship makes ballast as she flies along. This apparatus, however, is too heavy for use on non-rigids, and indeed it is estimated that the old *Macon* could have extended her flying range by some 1,500 miles, had it not been necessary to carry the water recovery gear; this would have given her a range of 11,000 miles at 50 m.p.h. carrying four aircraft and full crew. A very useful asset for the war against Japan.

For non-rigids, however, the problem has been largely solved when flying over the sea by lowering a hose fitted with an electric pump. By this method water is pumped up into the ship's ballast tanks while under way, and the loss of fuel compensated.

In passing, it may be mentioned that the same type of gear could also be carried on rigid airships. Modern airships can, if need be, fly overloaded by taking off like an aircraft, and gas can be saved by starting and landing when the sun is down. It is also possible to change crews and refuel when flying.

The other big problem was the old one of mooring and handling on the ground. In the past, due to narrow sheds, many an airship has been shed-bound when, if safely launched, she could have flown perfectly well. It is probably forgotten by now that thanks to our notorious weather the British Airship Service was the pioneer at this game, and the Americans began where we left off. Each American airship station is now equipped with transporter masts, to which the ship is moored after landing, and then taken into the shed, thus greatly reducing the size of the handling party and making it possible to take the airship in and out of its shed whilst on its mast, even in a considerable cross wind.

So successful have these masts been that the 420,000 cu. ft. "K" airships have, on occasions, been moored out 1,000 miles from a shed for weeks at a time. This is a big step forward, for in the past the largest ships to be so

moored never exceeded 125,000 cu. ft. A transporter mast is a development of the rigid-airship mast as developed in this country, and the first transporter mast was actually made at Kingsnorth, in 1915. The envelope of the old airship *Delta* was used, and although this particular effort was not successful, it showed the way for future development. Unfortunately, operational requirements made it impossible to go on with the experiment, but the names of the late Wing Commander N. F. Usborne, Wing Commander T. R. Cavé-Brown-Cave, and the late Colonel C. M. Waterlow, should not be forgotten in this connection, while the late Major G. H. Scott devised mooring mast details and the present-day method of mooring.

There is one drawback to mooring-out, however. Airship envelopes, when exposed for long periods, deteriorate more quickly than when housed in a shed, and in really hot climates with plenty of sunshine such deterioration might be relatively rapid.

The utmost care has been taken to develop a really good fabric, and so successful has this effort been that the peace-time Goodyear ships used to be inflated continuously, in some cases for as long as two years, in spite of frequent mooring-out. At the same time, on an average, they consumed only 50 per cent., and sometimes only 30 per cent. of their volume of gas during a year, a great improvement on the not uncommon 100 per cent. per month of the hydrogen-inflated ships.

Helium can be purified while an airship is still inflated, at a loss of gas which used to be about 10 per cent. of the airship's volume. Now, the U.S. Navy have developed a scheme of spraying water on airship envelopes when moored-out in hot weather, and this helps to prevent excessive superheat, and tends to preserve the envelope.

Thanks to transporter masts and the wise provision of large sheds, each 1,000ft. long and 246ft. wide, the American airships have seldom been weather-bound, and the only thing that normally keeps them on the ground is severe icing and electric storms. It is interesting to note that, thanks to their ability to fly in very poor weather, airships have at times flown for more days than aircraft. Flying in bad visibility has always been a speciality of the airship. As long ago as 1913 the old N.A.-3, piloted by the late Wing Commander N. F. Usborne, left Farnborough for Eastchurch to take the present Prime Minister for a flight, when the fog was so thick that the ground was out of sight at rather less than 250ft. Just before this Major E. M. Maitland took *Delta* over the enemy's lines in the Army exercises when, thanks to low clouds and rain, all aircraft were grounded. [They would not have been in modern times.—ED.]

U.S. NAVAL AIRSHIPS, SEPTEMBER, 1933.

Year	Name and Type	Volume cu. ft.	Length ft.	Diam. ft.	Motive Power, h.p.	Max. speed (approx.) m.p.h.	Remarks
1926	J4	212,000	—	—	—	50	Only U.S. ship with car slung at a distance from envelope. Envelope of a palish blue colour.
1929	MC2	202,300	149.5	528	2-200	68	Metal-clad. Since probably deleted.
1929	G1 (training type)	178,000	184	44	2-165 Wright Whirlwind	63	Ex Goodyear *Defender*.
1931	K1	320,000	229	—	2-300	73	First non-rigid to fly on Blaugas.
1933	T.C.13	360,000	233	54	2-375 Pratt and Whitney	75	Ex Army.
1936	T.C.14	380,000	237	57	2 300	75	Ex Army.
1938	L.1 (training type)	123,000	147	37.8	2-145 Warner	65	An improved edition of the Goodyear ships, *Enterprise* and *Puritan* which were also in existence at the beginning of the war.
1939	K2	414,000	246	—	2-Pratt and Whitney	About 75	—

The main job of the airship so far has been to escort coastal convoys, but when the large "M" ships come along it will be possible to accompany the convoy for much greater distances out to sea.

The airships are organised into groups and squadrons and although up-to-date figures may not be given, it can be stated that even in 1942, there were three squadrons at work with bases at Lakehurst, South Weymouth and Elizabeth City. Since then new airship stations have been built at Richmond, Brunswick, Houna and at other points. Thus gradually the whole U.S. eastern seaboard has been protected by airships, and the same progress has been made on the Pacific coast, with Moffat Field, Sunnyvale, again in full commission as the headquarters of several squadrons, and with other stations at Santa Ana and in the Upper Oregon, etc.

Airship Advantages

As for the airships themselves, they are heavily armed and are by no means purely a defensive weapon. Besides being ideal vessels for escorting sea-going convoys, they have the priceless advantage of being able to hover, if need be for hours on end, over a spot where a submarine has been seen to submerge or is supposed to be lurking, thus making it impossible for a U-boat to surface. Hot meals are cooked on board; photographs can be taken, developed and printed whilst in flight; radio and radar equipment is carried; and many a U-boat has fallen a victim to these prowling terrors. Even more important is that up to the spring of this year, not one single sea-going ship while under airship escort has been lost to U-boat attack.

Indeed, so successful have the airship operations been that, after the war, the Royal Canadian and Empire navies might well take an interest in the subject, organise an airship service, and so add a valuable auxiliary to the fleet.

AIR DEFENCE OF THE COLONIES

ADMIRAL OF THE FLEET LORD CHATFIELD, former Minister of Defence, envisages the development of local air forces throughout the Colonies as part of the Empire defence system after the war. He makes this point in a pamphlet issued by the National Liberal Party, price 6d., entitled "The Colonies and Their Future."

After referring to the changes in the imperial defence problem arising from the vast development of air weapons, he states: "Until recent times the attack on our Colonies had been mainly expected from seaborne raids, mine laying, submarine attacks, and sporadic attack by seaborne aircraft. This last form of attack will increase, because there will be a great increase in naval air weapons.

"But in addition there will be the menace from long-distance land-based aircraft. This will have to be met. *Inter alia*, by defensive measures such as A.A. guns and balloon barrages, aided by radio location and also by methods of counter-attack by fighter squadrons.

"Thus the cost will be increased, but it can be lessened by developing local air forces and by the development of air transport aircraft convertible into bombers. On the credit side, each colony will be a site for airfields, to build up our imperial air forces and so strengthen imperial defence in many ways. In this, Dominion air strength will play an important part.

"Only those who have taken part in this war and have experience of air strategy and tactics and of the cost involved can advise on the various sides of the problem in detail. But it is probably the biggest one that Colonial defence has to face.

"We may postulate that the peace settlement will ensure the removal of the air menace to our Colonies, as far as possible, by denying to potential foes air bases from which land-based or sea-based air attack can be effectively made upon them and on our line of Imperial communications."

The pamphlet has been prepared by an advisory committee of the party under the chairmanship of Sir Geoffrey Shakespeare, M.P. They declare that British sovereignty in the Colonies should remain unimpaired and reject any suggestion that the lands concerned should be put under international administration.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writer s not necessarily for publication, must in all cases accompany letters.

THEORY OF FLIGHT

Airscrew Pitch and Wind Direction

PERHAPS you or the readers of *Flight* could settle some differences that occurred to-day between myself, a pilot, and a flight sergeant fitter IIA.

Is it possible that, on a twin-engine aircraft, there will be any difference in the setting of the airscrew pitch levers when the aircraft is flying (a) directly into wind, (b) across wind?

In other words, does a cross-wind affect airscrew speed in the air? R. H. GARDENER.

[We prefer to leave it to readers to answer this.—ED.]

REST FOR W.O.s

Books and Periodicals Needed

WE are hoping to organise a rest and reading room for wireless operators at our R.A.F. unit, and any readers of *Flight* who may have books and periodicals of all classes, technical or non-technical, humorous, etc., will be deserving of our gratitude if they will send to the address below any such literature which they no longer require.

It is also hoped that firms in the aircraft industry of this country, and of the United States of America, will co-operate by sending us booklets and pamphlets. I should explain that it is the intention to make the library available to all classes of aircrew. P/O. R. F. MILLETT.

112, London Road,
Headington, Oxford.

TEST FLIGHT INSURANCE

A Possible Scheme Outlined

I SHOULD like to bring to your notice a possible scheme intended to help those who undertake flying risks on behalf of aircraft firms and the Civil Service, and who carry out design development or research tests under full-scale conditions.

At present it is exceptional to find that any comprehensive scheme of insurance more favourable than the Workmen's Compensation Act benefits is being made available to such flying personnel, i.e., technical assistants, flight observers and test pilots. The last-named are usually very highly paid and employed by contract. They are therefore in a better position financially to undertake the payment of insurance premiums; and are also probably secure, by contractual clauses, from worry with regard to post-accident benefit.

It is therefore mainly for the other two classes of flying personnel that an insurance scheme is required, which, when perfected, could become a recognised basic scheme throughout the aircraft industry.

The proposal is that the employer and the employee should take out a mutual policy through Lloyds underwriters, or some other insurance company; the premiums to be paid partly by deductions from the employee's wages, and with the following principal provisions:

1. During a fixed maximum period, or until the employee is able to resume active employment, whichever period ends the sooner:
   (a) Payment of the pre-accident earnings or other fixed salary, and
   (b) payment of the amount of hospital and medical fees, surgical appliances, etc., and certain expenses of convalescence, perhaps in accordance with a fixed scale.
2. If, beyond the above fixed maximum period, total or partial incapacity is sustained as a result of the accident, payment of a specified weekly sum, to be reduced (perhaps in accordance with a certain scale) by the amount of other earnings received.
3. Certain appropriate benefits to dependants in case of death or total incapacity after the maximum period in (1).

The advantages to the employer that offset to some extent the cost of such a scheme are: (1) If the scheme is one that can be certified by the Registrar of Friendly Societies, as providing better compensation than the Workmen's Compensation Acts, then it will take the place of the schemes under those Acts, so that there will be a corresponding saving to the employer to that extent. (2) As it is normal practice for employers to pay salary to an injured employee for a certain period of time, there is thus a second saving.

In addition to the foregoing, a large benefit is obtained by both parties by the avoidance of the possibly expensive, difficult and lengthy actions for damages against the employer, at common law.

E. N. BRAILSFORD, A.F.R.Ae.S.

11, Victoria Road, Mill Hill, N.W.7.

TRANSATLANTIC AIR TERMINAL

Seaside Scramble for Big Business

MAY I congratulate *Flight* for drawing attention, in its issue of August 17th, to what it so aptly describes (on the "Here and There" page) as the "undignified scramble for potential plums" by various seaside resorts all anxious to provide the country with its Transatlantic Air Terminal?

The writer of those notes might have used even stronger terms, for it is as plain as the proverbial pikestaff (whatever that is!) that the competing holiday resorts are only really interested in one thing—making money for themselves. Prestwick, already a Transatlantic Air Terminal playing a vital part in the war effort, is run by people who know their job and have a *bona fide* interest in the country's post-war civil aviation. Southampton and other ports also have real claims to consideration since they are established points of entry and departure. But seaside places concerned have one ambition only—the extraction of money from visitors. They have no particular interest in the development of aviation and, if some other idea for making money occurred to them which happened to be detrimental to civil aviation, they would not hesitate to adopt it.

If anyone doubts that any of these pleasure resorts are motivated solely by the idea of profit-making, let him try to get accommodation at anything but "profiteer's" prices, particularly on the safe north-west coast!

It is agreed by responsibly minded people that civil aviation can only thrive in the post-war world if it is made to serve the community. And while private enterprise may do that, I suggest that it must be in the hands of people who know the job, and not be farmed out to avaricious boarding-house keepers, side-show proprietors and similar holiday resort tradesmen. "REALIST."

DOWN-DRAUGHT CARBURETTORS

Gravity versus Reduced Density

A QUESTION has arisen which has drawn conflicting answers from the technical people whom I have asked. I am presenting it because I believe it will also be of interest to *Flight* readers and I am hoping that it will be correctly answered.

Here is the question: One of the advantages of the down-draught carburettor air intake over the up-draught type is that air is assisted into the engine by the pull of gravity. Is this true?

If it is so, this will mean that the power absorbed by the impeller of the supercharger to compress the mixture to a given boost will be less, and this will result in an increase in b.h.p.

The particular engine under consideration is the Bristol Hercules fitted with the Claudel-Hobson master-control carburettor.

I offer the following as one answer: The depression caused by the impeller and engine piston (during the induction stroke) will lower the density of the air as it enters the air intake. This follows one of the laws of gases. If the pressure of a gas is decreased, its density will also decrease. Now if the density of air is decreased it will tend to rise, and if the impeller is drawing it through the intake *down* to the carburettor it will mean that *more* power will be absorbed by the impeller, so the advantage in this case would be gained with the up-draught type of air intake.

Here is another answer which struck me as being correct on first sight: In the case of the down-draught type, air is being drawn or pulled towards the earth, and where densities are not involved it is easier to pull something assisted by gravity as compared with pulling against gravity.

In these suggestions I have assumed that, for a given atmospheric pressure at sea level, the atmospheric pressure difference of the air surrounding the two types of air intakes is nil.

H. M. MYERS, Stud. R.Ae.S.

WINGED CANOPY: Horsas and Dakotas standing wing-tip to wing-tip in Italy ready for the landings in Southern France.

SERVICE AVIATION

Royal Air Force and Fleet Air Arm News and Announcements

Appointments

Air Comdre. F. J. FOGARTY, D.F.C., A.F.C., to be Senior Air Staff Officer, No. 4 Group.

Act. Air Comdre. L. F. SINCLAIR, G.C., C.B.E., D.S.O., to be Senior Air Staff Officer, A.H.Q., Balkan Air Force, M.A.A.F.

Group Capt. (Act. Air Comdre.) the EARL OF BANDON, D.S.O., to be Air Officer Commanding No. 224 Group.

Group Capt. (Act. Air Comdre.) W. G. CHESHIRE, to be Chief Intelligence Officer, H.Q., Air Command, South-East Asia.

Group Capt. (Act. Air Comdre.) F. R. DREW to be Commander, Coastal Air Defences, South Africa.

Col. (Act. Brig.) J. T. DURRANT, D.F.C., S.A.A.F. to be Air Officer Commanding No. 205 Group.

Promotions

GENERAL DUTIES BRANCH.

Air Marshals (Act. Air Chief Marshals) to be Air Chief Marshals (temp.). August 16th, 1944
Sir TRAFFORD L. LEIGH-MALLORY, K.C.B., D.S.O.
Sir ARTHUR T. HARRIS, K.C.B., O.B.E., A.F.C.

Air Vice-Marshals (Act. Air Marshals) to be Air Marshals (temp.). August 16th, 1944.
Sir RODERICK M. HILL, K.C.B., M.C., A.F.C.
Sir KEITH R. PARK, K.B.E., C.B., M.C., D.F.C.
Sir GRAHAME DONALD, K.C.B., D.F.C., A.F.C.
Sir NORMAN H. BOTTOMLEY, K.C.B., C.I.E., D.S.O., A.F.C.
Sir FRANCIS J. LINNELL, K.B.E., C.B.
Sir ARTHUR CONINGHAM, K.C.B., D.S.O., M.C., D.F.C., A.F.C.

Air Comdre. (temp.) (Act. Air Vice-Marshal) F. L. HOPPS, C.B.E., A.F.C., is granted the rank of Group Capt. (war subs.), May 1st, 1943, and Air Comdre. (war subs.), July 28th, 1944.

Awards

THE KING has been graciously pleased to approve the following awards in recognition of gallantry and devotion to duty in the execution of air operations:—

Distinguished Service Order

Act. Sqn. Ldr. C. C. SCHERF, D.F.C., R.A.A.F.—On two occasions in May, 1944, this officer led a section of Mosquito aircraft on daylight sorties over well defended areas far into Germany. During these two flights a number of enemy aircraft were destroyed, of which Sqn. Ldr. Scherf shot down

Lt. Cdr. (A) M. F. Fell, R.N., who was awarded the D.S.O. for his part in the *Tirpitz* action.

six; he also destroyed three on the ground. His successes are a splendid tribute to his great skill, enterprise and fearlessness. This officer has set an example of the highest order.

Wing Cdr. R. H. MCCONNELL, D.F.C., R.A.F., No. 235 Sqn.—This officer has completed a large number of reconnaissance and anti-shipping sorties since the award of the D.F.C. As commanding officer of his squadron he has set an outstanding example of courage, and by his leadership has been largely responsible for the exceptional success attained. Wing Cdr. McConnell has completed three tours of operational duty and has proved himself an excellent officer and commander both on the ground and in the air.

Act. Wing Cdr. J. S. DINSDALE, D.F.C., R.A.F.O., No. 489 (R.N.Z.A.F.) Sqn.—This officer has completed his third tour of operational duty and, since the award of the D.F.C. has rendered valuable and outstanding service as squadron commander. Most of his missions have been attacks on enemy shipping. They have invariably been completed with exceptional courage in the face of heavy anti-aircraft fire and fighter opposition. Through his experience and example, the morale and efficiency of his squadron have reached a high standard under his leadership.

Act. Wing Cdr. N. B. HARVEY, R.A.F., No. 59 Sqn.—During attacks on shipping from Italy, Sardinia and Corsica Wing Cdr. Harvey's squadron has been heavily and continuously engaged in operations with much success. During attacks led by this officer, three enemy merchant vessels have been destroyed and one destroyer has been sunk and others damaged. The squadron has destroyed 21 enemy aircraft, damaging others. Wing Cdr. Harvey has personally destroyed one enemy air transport and damaged another during the evacuation of Corsica by the enemy. This officer is a keen student of operational technique and has trained his squadron with great efficiency.

Act. Sqn. Ldr. L. A. MALINS, D.F.C., R.A.F.V.R., No. 260 Sqn.—This officer has taken an active part in the campaigns in the Western Desert, North Africa, Sicily and Italy and has always displayed outstanding leadership and gallantry. Apart from much enemy equipment destroyed by his flight while under his leadership he has personally destroyed at least one enemy aircraft in combat. In April, 1944, he completed two outstanding missions against enemy ammunition dumps, during the first of which eight large dumps were set alight and destroyed regardless

SERVICE AVIATION

of intense anti-aircraft fire. Sqn. Ldr. Malins' aircraft was damaged by a large shell fragment early in the operation, but he continued to make repeated runs over the target. During the second of these missions his flight destroyed at least four enemy aircraft. This officer has proved himself to possess outstanding courage and has set a fine example to his fellow pilots.

Act. Wing Cdr. R. WEBB, D.F.C., R.N.Z.A.F.—Since being awarded the D.F.C., this officer has continued to lead his wing with courage, inspiring them by his determination and selfless devotion to duty. A typical example of his tenacity and courage occurred in May, 1944, when he was leading a formation of Spitfires on a low level bombing sortie. His aircraft was hit by two explosive bullets which burst inside the cockpit, rendering him unconscious and causing injuries which resulted in blindness of the right eye. Wing Cdr. Webb regained consciousness quickly and asked another pilot in the formation to lead him the 200 miles back to base, where he made a perfect landing.

Lt. Col. W. A. NEL, D.F.C., S.A.A.F., No. 40 (S.A.A.F.) Sqn.—As squadron commander during the past ten months Lt. Col. Nel has displayed outstanding courage, determination and leadership. During the Italian campaign he has operated in support of army units with exceptional success. On one occasion his aircraft was shot down by intense enemy fire. His engine caught fire, but with great determination Lt. Col. Nel managed to come down behind our own lines. Though injured and shaken he rejoined his squadron and took part in operations immediately. On another sortie he obtained a valuable photograph of targets in the Liri valley which he had secured in the face of highly concentrated anti-aircraft fire. By his courage and devotion to duty this officer has invariably set a fine example to those under his command.

Maj. K. C. WHYTE, D.F.C., S.A.A.F., No. 5 (S.A.A.F.) Sqn.—Since the award of the D.F.C., this officer has completed many operational sorties of a dangerous and difficult nature. As squadron commander he has flown on practically every sortie undertaken by his pilots and under his leadership an impressive record has been built up. Maj. Whyte has exceptional navigational ability and, together with his outstanding determination, this has enabled him to locate and attack targets in adverse weather. Since becoming squadron commander he has led formations during which several thousand tons of enemy shipping, over 90 mechanical transport vehicles and many locomotives and railway trucks have been destroyed. He has destroyed one enemy aircraft and damaged others.

Bar to Distinguished Flying Cross

Act. Wing Cdr. T. PRESTON, D.F.C., R.A.F., No. 624 Sqn.—This officer has completed several arduous sorties since the award of the D.F.C. In December, 1943, he flew as captain of a crew detailed to bomb Berlin. The mission was successfully accomplished, but during the return flight adverse weather and very poor visibility were encountered. Despite this, Wing Cdr. Preston by his coolness and skill was able to make a successful landing in the United Kingdom. Apart from his heavy responsibilities in building up and organising a new squadron this officer has set a magnificent example as a captain of aircraft.

Act. Sqn. Ldr. S. J. BEARD, D.F.C., R.A.F.V.R., No. 61 Sqn.—Since the award of the D.F.C., this officer has completed a number of operational sorties, including five attacks on Berlin. As a flight commander he has given proof of outstanding powers of leadership. During an attack on Tours in April, 1944, he executed a telling attack on railway sidings in the face of accurate anti-aircraft fire and at a low altitude. This attack was outstandingly successful, chiefly owing to Sqn. Ldr. Beard's fine work.

Act. Sqn. Ldr. H. H. GRANT-DALTON, D.F.C., R.A.F.V.R., No. 100 Sqn.—This officer has completed two tours of operational duty, during which he has taken part in attacks on some of the enemy's most important and highly defended targets, including Berlin. He has at all times pressed home his attacks, undeterred by the heaviest enemy opposition, and his ability to make instant decisions in emergencies and superb airmanship have, on many occasions, extricated his aircraft and crew from perilous situations.

Act. Flt. Lt. W. H. GOLDSTRAW, D.F.C., R.A.F., No. 467 (R.A.A.F.) Sqn.—Flt. Lt. Goldstraw has completed two tours of operational duty. In the air his outstanding skill, thoroughness and resourcefulness have proved him a most accomplished navigator. As squadron navigation leader he has contributed largely to the successful completion of many of the squadron's missions.

Act. Flt. Lt. R. L. WAKE, D.F.C., R.A.F.V.R., No. 106 Sqn.—Since being awarded the D.F.C., this officer has taken part in several successful operational sorties, and during the last five months has performed the duties of squadron bombing leader, achieving excellent results. In April, 1944, he was bomb-aimer in an aircraft detailed to lay mines in a canal. The canal was approached at low level in the face of intensive anti-aircraft fire and illumination by searchlights. Despite these difficult and hazardous conditions, this officer remained unperturbed, and with the utmost coolness and determination dropped his mines carefully and accurately. On all his sorties Flt. Lt. Wake has maintained a consistently high standard, and by his coolness in time of stress has materially contributed to the successful completion of many sorties.

F/O. R. MASCALL, D.F.C., R.A.F.V.R., No. 138 Sqn.—This navigator has completed a very large number of sorties, which have included attacks on such important targets as Cologne and Hamburg. Since the award of the D.F.C., he has completed a number of sorties, during which he has displayed exemplary skill and keenness for operations. Regardless of the heaviest opposition, F/O. Mascall has always shown exceptional determination to reach his target, and his cheerfulness and devotion to duty have been an inspiration to all in the squadron.

P/O. E. T. JONES, D.F.C., R.C.A.F., No. 105 Sqn.—Since the award of the D.F.C., this officer has continued to display great keenness for operational flying. He has taken part in a number of sorties, many of them on the major German targets, where fierce opposition is invariably encountered. The heaviest anti-aircraft and fighter action have never deterred him in any way from the completion of his allotted task.

Act. Sqn. Ldr. P. J. LAMASON, D.F.C., R.N.Z.A.F., No. 15 Sqn.—Since the award of the D.F.C., this officer has continued to operate with courage and devotion to duty of a high order. He has completed a large number of operational missions, including several attacks on Berlin and other heavily defended German targets, and has always pressed home his attacks with vigorous determination. His gallantry, leadership and enthusiasm have been extremely praiseworthy.

Act. Sqn. Ldr. G. A. PATRICK, D.F.C., R.N.Z.A.F., No. 109 Sqn.—Since being awarded the D.F.C., this officer has participated in many more operational sorties. They have included bombing attacks against heavily defended and important enemy targets in Germany and occupied territory. He has, throughout, displayed a fine fighting spirit, outstanding navigational ability and great devotion to duty.

Flt. Lt. D. J. B. WILSON, D.F.C., R.A.F.V.R., No. 617 Sqn.—Since the award of the D.F.C., this officer has completed a third tour of operational duty, during which his experience, determination and devotion to duty have been displayed in the course of many sorties. As a captain of aircraft he can always be relied upon to complete tasks in the face of the heaviest enemy opposition. He has a long and distinguished record of operational flying.

Act. Flt. Lt. K. R. AMES, D.F.C., R.A.F.V.R., No. 630 Sqn.—Since the award of the D.F.C., Flt. Lt. Ames has completed a large number of operational sorties, including seven of the recent attacks on Berlin. He is an outstanding captain of aircraft and, by his skill as a pilot and his courage and determination, has set an excellent example to other captains. As a deputy flight commander he has displayed efficiency and has taken a keen interest in training new crews.

Flt. Lt. R. F. DAVIES, D.F.C., R.A.F.V.R., No. 627 Sqn.—This officer was the navigator of an aircraft detailed for an operation against Munich recently. When nearing the target the aircraft was illuminated in a concentration of searchlights and was subjected to extremely heavy fire from the ground defences. One engine was hit and rendered useless. Despite this, the pilot held to his course. Although almost blinded by the glare of the searchlights, Flt. Lt. Davies skilfully directed the bombing run and a successful attack was made. Considerable difficulty was experienced in evading the searchlights, but, displaying great coolness, Flt. Lt. Davies gave the necessary directions for the pilot to steer in order to avoid the worst concentrations. As course was set for this country, considerable height was lost, but Flt. Lt. Davies plotted his way home with great skill, and his fine work played a worthy part in the safe return of the aircraft. Throughout the sortie, this officer displayed commendable coolness and resolution and proved a tower of strength in difficult circumstances.

Act. Sqn. Ldr. J. M. V. CARPENTER, D.F.C., R.A.F.O., No. 72 Sqn.—This officer has an exceptional record, having been engaged on operational flying almost continuously since the outbreak of the war. He has been in command of his squadron since January, 1944. The many successes achieved by the squadron during that period are in no small measure due to the fine leadership of Sqn. Ldr. Carpenter, and the inspiring example he has set of steadfastness and devotion to duty. Since being awarded the D.F.C., this officer has destroyed a further three enemy aircraft, bringing his total victories to eight both enemy aircraft destroyed.

Act. Sqn. Ldr. M. P. NASH, D.F.C., R.A.A.F., No. 3 (R.A.A.F.) Sqn.—Throughout his service as squadron commander, Sqn. Ldr. Nash has displayed outstanding leadership, courage and determination which have had fine results in the successes achieved. On numerous missions he has pressed home his attacks at a low level in the face of intense and accurate anti-aircraft fire. He has completed a large number of fighter bomber sorties in North Africa, Malta, Sicily and Italy, and has led many successful operations.

Act. Flt. Lt. J. C. DOYLE, D.F.C., R.A.A.F., No. 3 (R.A.A.F.) Sqn.—After completing a tour of duty on fighter bomber operations this officer volunteered for a further spell of operational duty. He has taken part in a large number of successful sorties and inflicted much damage on enemy mechanised transport. In March, 1944, he led a formation of twelve aircraft on an armed reconnaissance to Yugoslavia, during which a Siebel ferry and one enemy schooner at least were destroyed. Six days later Flt. Lt. Doyle took part in an attack on an enemy airfield at Forli. In the face of severe opposition he silenced eight Breda gun posts and personally destroyed two enemy aircraft and three fuel tanks. The following month, armed reconnaissances led by this officer resulted in the destruction of 42 enemy mechanical transport vehicles. Throughout Flt. Lt. Doyle has set a fine example of leadership and has been largely responsible for the high standard of operational efficiency attained by his squadron.

Act. Flt. Lt. A. J. D. RUTTLEDGE, D.F.C., R.C.A.F., No. 624 Sqn.—Since being awarded the D.F.C. in May, 1943, Flt. Lt. Ruttledge has completed many more operational sorties. He has flown over enemy-occupied territory in Europe with a complete disregard of opposition or adverse weather. This officer is a courageous pilot whose courage and devotion to duty have always been of the highest order.

Maj. D. W. MAREE, D.F.C., S.A.A.F., No. 40 (S.A.A.F.) Sqn.—Since being awarded the D.F.C., this officer has completed further operational sorties, each one of which has reflected his great enthusiasm, skill and courage. Many of these sorties were low-level flights over well-defended enemy targets, and the excellent photographs Maj. Maree obtained contributed greatly to later successful operations.

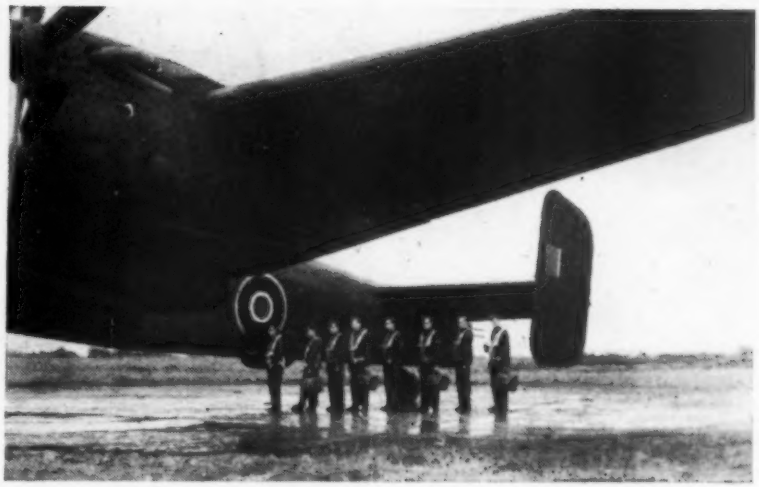
Distinguished Flying Cross

Act. Sqn. Ldr. R. C. MACANDREW, R.A.F.V.R., No. 141 Sqn.

Act. Flt. Lt. A. E. BILLSON, R.A.F.V.R., No. 115 Sqn.

MORE FLYING W.A.A.F.s: L.A/CW.s M. Brown and D. Tee are Equipment Assistants who do their job of delivery in aircraft of the A.T.A. L.A/CW. Tee is seen handing over goods to the R.A.F. after delivery by an Anson.

Act. Flt. Lt. C. S. Chattes, R.A.F.V.R., No. 97 Sqn.
Act. Flt. Lt. M. P. Floyd, R.A.F.V.R., No. 103 Sqn.
F/O. K. R. Cox, R.A.F.V.R., No. 10 Sqn.
F/O. P. L. U. Cross, R.A.F.V.R., No. 139 Sqn.
F/O. C. J. Dunn, R.A.F.V.R., No. 106 Sqn.
F/O. T. D. Halbert, R.A.F.V.R., No. 83 Sqn.
F/O. R. Pennicott, R.A.F.V.R., No. 10 Sqn.
F/O. L. Wilk, R.A.F.V.R., No. 141 Sqn.
P/O S. J. Butler, R.A.F.V.R., No. 10 Sqn.
P/O. A. J. Horton, R.A.F.V.R., No. 115 Sqn.
W/O. A. Whitehouse, R.A.F.V.R., No. 83 Sqn
P/O. R. G. Jackson, R.A.F.V.R., No. 149 Sqn.
P/O. F. W. McLelland, R.A.F.V.R., No. 51 Sqn
Act. Sqn. Ldr. D. J. Sale, D.S.O., R.C.A.F., No. 35 Sqn.
Act. Flt. Lt. B. E. Betcher, No. 419 (R.C.A.F.) Sqn.
Act. Flt. Lt. K. H. Whittington, R.C.A.F., No. 102 Sqn.
P/O. R. W. Folkes, R.C.A.F., No. 77 Sqn.
P/O. H. R. Kennedy, R.C.A.F., No. 51 Sqn.
P/O. F. N. Prebble, R.C.A.F., No. 10 Sqn.
Act Sqn. Ldr. G. A. Davison, R.A.F.V.R., No 576 Sqn.
Flt. Lt. S. J. Arnfield, R.A.F., No. 166 Sqn.
Act. Flt. Lt. L. S. Lunsdaine, R.A.F.V.R., No 199 Sqn.
Act. Flt. Lt. D. H. Pearce, R.A.F.V.R., No. 9 Sqn.
F/O. H. Blow, R.A.F.V.R., No. 9 Sqn.
F/O. G. C. Fenton, R.A.F.V.R., No. 10 Sqn.
F/O. W. A. Johnson-Biggs, R.A.F., No. 619 Sqn
F/O. C. T. Manson, R.A.F.V.R., No. 77 Sqn.
F/O. R. W. Pritchard, R.A.F.V.R., No. 77 Sqn
P/O J. T. Clarke, R.A.F.V.R., No. 10 Sqn.
P/O. F. R. G. A. Higgins, R.A.F., No. 630 Sqn
P/O. J. A. W. McCallum, R.A.F.V.R., No. 44 Sqn
P/O A. Morrison, R.A.F.V.R., No. 50 Sqn
P/O. C. C. Smith, R.A.F.V.R., No. 77 Sqn
P/O. E. B. Till, R.A.F., No. 77 Sqn.
Act. Flt. Lt. C. T. Harper, R.A.A.F., No. 207 Sqn
Act. Flt. Lt. A. Hollings, R.A.A.F., No. 207 Sqn.
F/O H. S. L. Crouch, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
F/O. A. A. Taylor, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
F/O. A. V. Withers, R.A.A.F., No. 106 Sqn.
P/O. E. M. England, R.A.A.F., No. 550 Sqn.
P/O. C. S. Fullon, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
P/O. H. Glasby, R.A.A.F., No. 630 Sqn.
P/O. W. D. Marshall, R.A.A.F., No. 467 (R.A.A.F.) Sqn.
F/O E. N. Hooke, R.C.A.F., No. 103 Sqn.
F/O. A. Rimmer, R.C.A.F., No. 44 Sqn.
P/O. W. J. Bolduc, R.C.A.F., No. 15 Sqn.
P/O. L. G. Cramer, R.C.A.F., No. 77 Sqn.
P/O. I. J. Scott, R.C.A.F., No. 10 Sqn.
P/O. J. A. Wilding, R.C.A.F., No. 50 Sqn.
W/O. G. E. L. Angell, R.C.A.F., No. 77 Sqn.
W/O. L. M. T. Murie, R.C.A.F., No. 429 Sqn.
Act. Flt. Lt. A. S. Keith, R.N.Z.A.F., No. 50 Sqn.
P/O. I. G. Kaye, R.N.Z.A.F., No. 7 Sqn.
P/O. J. D. Whiteman, R.N.Z.A.F., No. 10 Sqn.
Act. Sqn. Ldr. A. Harte-Lovelace, R.A.F.O., 578 Sqn.
F/O. B. H. Botha, R.A.F.V.R., No. 50 Sqn.
P/O. T. B. Fjeldsted, R.C.A.F., No. 429 (R.C.A.F.) Sqn.
P/O. R. W. Tuck, R.A.F.V.R., No. 21 Sqn.
F/O. G. T. Graham, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Act. Sqn. Ldr. D. T. Downer, R.A.F.V.R., No. 279 Sqn.
Act. Sqn. Ldr. H. H. C. Holderness, A.F.C., R.A.F.V.R., No. 502 Sqn.
Act. Sqn. Ldr. R. K. H. Johnson, R.A.F.V.R., No. 272 Sqn.
Act. Sqn. Ldr. A. H. Mawer, R.A.F.V.R., No. 624 Sqn.
Act. Sqn. Ldr. R. L. Wade, R.A.F., No. 153 Sqn.
Flt. Lt. B. J. Blackburn, R.A.F.V.R., No. 72 Sqn.
Flt. Lt. A. F. Boyd, R.A.F.V.R., No. 415 (R.C.A.F.) Sqn.
Flt. Lt. L. H. Cherry, R.A.F.V.R., No. 250 Sqn.
Flt. Lt. H. G. Cullen, R.A.F.V.R., No. 144 Sqn.
Flt. Lt. D. Evans, R.A.F., No. 502 Sqn.
Flt. Lt. R. V. Hearn, R.A.F.V.R., No. 250 Sqn.
Flt. Lt. B. R. Kenwright, R.A.F.V.R., No. 542 Sqn
Act. Flt. Lt. E. Gooch, R.A.F.V.R., No. 55 Sqn.
Act. Flt. Lt. W. A. R. MacDonald, R.A.F.V.R., No. 145 Sqn.
Act. Flt. Lt. G. J. Matthews, R.A.F.V.R., No. 603 Sqn.
Act. Flt. Lt. R. Plenderleith, R.A.F.V.R., No 253 Sqn.
F/O. P. J. Gallagher, R.A.F.V.R., No. 36 Sqn.
F/O. E. H. Guest, R.A.F.V.R., No. 148 Sqn.
F/O. H. Lord, R.A.F., No. 224 Sqn.
F/O. T. A. Newman, R.A.F.V.R., No. 55 Sqn.
F/O. V. B. White, R.A.F.V.R., No. 542 Sqn.
P/O. J. T. Foy, R.A.F.V.R., No. 120 Sqn.
P/O. W. A. J. Hook, R.A.F.V.R., No. 39 Sqn.
P/O. H. B. Tatham, R.A.F., No. 254 Sqn.
W/O. C. Fortune, R.A.F., No. 148 Sqn.
W/O. W. T. Serle, R.A.F.V.R., No. 223 Sqn.
W/O. R. C. Turton, R.A.F.V.R., No. 236 Sqn.
Flt. Lt. J. Beatson, R.A.A.F., No. 249 Sqn.
F/O. L. D. Stanton, R.A.A.F., No. 37 Sqn.
P/O. K. M. Hayes, R.A.A.F., No. 250 Sqn.
Flt. Lt. R. R. Lipsit, R.C.A.F., No. 114 Sqn.
Flt. Lt. T. J. Masters, R.C.A.F., No. 36 Sqn.
Act. Flt. Lt. R. A. Gauthier, R.C.A.F., No. 415 (R.C.A.F.) Sqn.
F/O. E. J. Keefe, R.C.A.F., No. 404 (R.C.A.F.) Sqn.
F/O. J. W. Mathers, R.C.A.F., No. 162 Sqn.
F/O. G. Ovens, R.C.A.F., No. 502 Sqn.
P/O. J. E. V. Banning, R.C.A.F., No. 162 (R.C.A.F.) Sqn
Act. Flt. Lt. J. Montgomerie, R.N.Z.A.F., No. 92 Sqn.



REAL THING: One hundred cadets of No. 371 (Sheffield) Squadron, A.T.C., went on a week's training course recently at a Yorkshire R.A.F. station. The course included: gunnery, bombing, navigation, air/sea rescue, and many other subjects with which aircrews must be familiar. This photo shows some of the cadets about to board a Halifax.

W/O. H. S. McCullum, R.N.Z.A.F., No. 18 Sqn.
Capt. D. A. Ruiter, S.A.A.F., No. 2 (S.A.A.F.) Sqn.
Act. Capt. V. H. G. A. Martin, S.A.A.F., No. 2 (S.A.A.F.) Sqn.
P/O. H. F. W. Bampton, R.A.F.V.R., No. 138 Sqn.
P/O. A. Bennett, R.A.F.V.R., No. 466 (R.A.A.F.) Sqn.
P/O. A. W. M. Birchenough, R.A.F.V.R., No. 9 Sqn.
P/O. G. W. Cash, R.A.F.V.R.
P/O. F. L. Chipperfield, R.A.F.V.R., No. 619 Sqn.
P/O. F. Collis, R.A.F.V.R., No. 207 Sqn.
P/O. F. S. Colman, R.A.F.V.R., No. 9 Sqn.
P/O. T. F. Cook, R.A.F.V.R., No. 100 Sqn.
P/O. H. Crook, R.A.F.V.R., No. 626 Sqn.
P/O. D. V. A. Curley, R.A.F.V.R., No. 428 (R.C.A.F.) Sqn.
P/O. R. L. Davison, R.A.F.V.R., No. 44 Sqn.
P/O. J. P. Dillon, R.A.F.V.R., No. 156 Sqn.
P/O. J. C. Dougherty, R.A.F.V.R., No. 619 Sqn.
P/O. J. W. Doull, R.A.F.V.R., No. 640 Sqn.
P/O. C. W. Earnshaw, R.A.F.V.R., No. 85 Sqn
P/O. T. Gallacher, R.A.F.V.R., No. 626 Sqn.
P/O. E. C. Gregory, R.A.F.V.R., No. 35 Sqn.
P/O. G. B. Haywood, R.A.F.V.R., No. 432 (R.C.A.F.) Sqn.
P/O. H. W. Lawes, R.A.F., No. 102 Sqn.
P/O. R. M. Mogg, R.A.F.V.R., No. 626 Sqn.
P/O. R. W. Olsen, R.A.F.V.R., No. 619 Sqn.
P/O. C. W. Rathmell, R.A.F.V.R., No. 76 Sqn.
P/O. F. J. A. Redman, R.A.F.V.R., No. 207 Sqn.
P/O. D. S. Richardson, R.A.F.V.R., No. 50 Sqn
P/O. P. W. Robert, R.A.F.V.R., No. 576 Sqn.
P/O. M. A. Rooney, R.A.F.V.R., No. 83 Sqn.
P/O. L. Smith, R.A.F.V.R., No. 161 Sqn.
P/O. A. G. R. Usden, R.A.F.V.R., No. 207 Sqn.
P/O. J. Watt, R.A.F.V.R., No. 50 Sqn.
P/O. H. Young, R.A.F.V.R., No. 138 Sqn.
W/O. (now P/O.) C. N. Farnes, R.A.F., No. 90 Sqn.
W/O. J. E. Fox, R.A.F.V.R., No. 105 Sqn.
W/O. E. Hartley, R.A.F.V.R., No. 405 (R.C.A.F.) Sqn.
W/O. J. C. Parker, R.A.F.V.R., No. 83 Sqn.
W/O. H. F. Robinson, R.A.F., No. 9 Sqn.
W/O. L. H. Smith, R.A.F.V.R., No. 97 Sqn.
Act. W/O. T. Tilley, R.A.F.V.R., No. 582 Sqn.
P/O. D. E. Ball, R.A.A.F., No. 625 Sqn.
P/O. J. Conley, R.A.A.F., No. 625 Sqn.
P/O. A. G. King, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
P/O. G. C. Notman, R.A.A.F., No. 550 Sqn.
P/O. J. T. Torrance, R.A.A.F., No. 626 Sqn.
W/O. A. G. Strickland, R.A.A.F., No. 83 Sqn.
W/O. M. Stafford, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
F/O. W. L. Barrett, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. H. C. Bugden, R.C.A.F., No. 571 Sqn.
F/O. R. W. Butcher, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. J. A. De Rosenroll, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. J. P. Greco, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. R. M. Griffiths, R.C.A.F., No. 405 (R.C.A.F.) Sqn.
F/O. C. E. Hanson, R.C.A.F., No. 460 (R.A.A.F.) Sqn.
F/O. M. E. Howard, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
F/O. A. J. Miles, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
F/O. I. M. Pare, R.C.A.F., No. 138 Sqn.
F/O. D. R. Rand, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
F/O. A. Romano, R.C.A.F., No. 106 Sqn.
P/O. S. B. Black, R.C.A.F., No. 12 Sqn.
P/O. I. H. Dobbin, R.C.A.F., No. 103 Sqn.
P/O. I. G. Edson, R.C.A.F., No. 90 Sqn.
P/O. J. B. Findlay, R.C.A.F., No. 635 Sqn.
P/O. D. J. C. Fleming, R.C.A.F., No. 103 Sqn
P/O. W. B. Lennox, R.C.A.F., No. 408 (R.C.A.F.) Sqn.
W/O. T. E. Boyle, R.C.A.F., No. 550 Sqn.
W/O. W. C. Campbell, R.C.A.F., No. 35 Sqn
W/O. J. Heaton, R.C.A.F., No. 427 (R.C.A.F.) Sqn.
W/O. F. W. Logan, R.C.A.F., No. 207 Sqn.
W/O. E. Plunkett, R.C.A.F., No. 83 Sqn.
W/O. D. A. Wager, R.C.A.F., No. 35 Sqn
F/O. H. C. Barlow, R.N.Z.A.F., No. 149 Sqn.
F/O. T. J. Nation, R.N.Z.A.F., No. 75 (R.N.Z.A.F.) Sqn.
F/O. V. O. Viggers, R.N.Z.A.F., No. 101 Sqn
Flt. Lt. J. R. Dow, R.C.A.F., No. 635 Sqn.
Act. Flt. Lt. C. M. Carter, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Act. Flt. Lt. R. N. Douglass, R.C.A.F., No. 428 (R.C.A.F.) Sqn.
Act. Flt. Lt. D. G. Hall, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Act. Flt. Lt. J. K. Hamilton, R.C.A.F., No 100 Sqn.
Act. Flt. Lt. H. A. Hewitt, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Act. Flt. Lt. F. T. Judah, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Act. Flt. Lt. J. O. Richard, R.C.A.F., No. 550 Sqn.
Flt. Lt. W. D. Reeveley, R.N.Z.A.F., No. 76 Sqn.
Flt. Lt. D. H. Todd, R.N.Z.A.F., No. 101 Sqn.
Act. Flt. Lt. H. L. Burton, R.N.Z.A.F., No. 75 (R.N.Z.A.F.) Sqn.
Lt. J. C. White, No. 23 (S.A.A.F.) Sqn.

THE KING has been graciously pleased to approve the following award, with effect from July 21, 1944, in recognition of gallantry displayed in flying operations against the enemy in the South-West Pacific area:—

Distinguished Flying Cross

Sqn. Ldr. L. M. Hurt, R.A.A.F.

Distinguished Flying Medal

Flt. Sgt. H. Bailey, R.A.F., No. 149 Sqn.
Flt. Sgt. (now P/O.) A. L. Bartlett, R.A.F.V.R., No. 50 Sqn.
Flt. Sgt. H. C. Clayton, R.A.F.V.R., No. 77 Sqn.
Flt. Sgt. A. S. Jackson, R.A.F.V.R., No. 77 Sqn
Flt. Sgt. D. Pinckard, R.A.F.V.R., No. 106 Sqn.
Flt. Sgt. J. C. A. Rodgers, R.A.F.V.R., No. 30 Sqn.
Flt. Sgt. P. Wild, R.A.F.V.R., No. 103 Sqn.
Sgt. V. H. Blackwell, R.A.F.V.R., No. 106 Sqn.
Sgt. D. Chalmers, R.A.F.V.R., No. 44 Sqn.
Sgt. W. A. Clarke, R.A.F.V.R., No. 51 Sqn.
Sgt. R. M. Galloway, R.A.F.V.R., No. 207 Sqn
Sgt. G. F. Phillipson, R.A.F.V.R., No. 10 Sqn
Flt. Sgt. L. J. Burrows, R.A.A.F., No. 460 (R.A.A.F.) Sqn.
Flt. Sgt. (now P/O.) H. R. Allin, R.C.A.F., No. 192 Sqn.
Flt. Sgt. (now P/O.) H. A. B. Salkeld, R.C.A.F.
Sgt. N. C. Fraser, R.C.A.F., No. 419 (R.C.A.F.) Sqn.
Sgt. W. C. Shaw, R.A.F.V.R., No. 460 (R.A.A.F.) Sqn.
Flt. Sgt. H. S. Tiller, R.A.A.F., No. 44 Sqn
Sgt. L. F. Martin, R.C.A.F., No. 419 (R.C.A.F.) Sqn.

SERVICE AVIATION

Flt. Sgt. J. E. BIRCH, R.A.F.V.R., No. 70 Sqn.
Flt. Sgt. W. J. DOE, R.A.F.V.R., No. 114 Sqn.
Flt. Sgt. M. HENSTOCK, R.A.F.V.R., No. 153 Sqn.
Flt. Sgt. J. McNAB, R.A.F.V.R., No. 142 Sqn.

Roll of Honour

Casualty Communiqué No. 421.

THE Air Ministry regrets to announce the following casualties on various dates. The next of kin have been informed. Casualties "in action" are due to flying operations against the enemy; "on active service" includes ground casualties due to enemy action, non-operational flying casualties, fatal accidents and natural deaths.

Of the names in this list, 105 are second entries giving later information of casualties published in earlier lists.

Royal Air Force

KILLED IN ACTION.—Flt. Sgt. E. Allan; Sgt. T. S. Combe; Sgt. P. M. Couturier; F/O. J. A. Hall, D.F.C.; Flt. Sgt. A. R. Hogwood; F/O. A. J. Hughes; Flt. Sgt. H. M. Hughes.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—Sgt. F. G. Beardwell; Sgt. T. J. Clark; Sgt. G. Douglas; Sgt. R. E. Woodford; F/O. J. R. Fisher; Sgt. F. M. Freeman; Flt. Sgt. R. Hurrell; Sgt. J. L. Killan; Sgt. M. Monaghan; Sgt. F. G. Newton; P/O. A. Rankin; Sgt. J. Saffrey; Sgt. L. A. Sim; Sgt. D. F. Thomas.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Sgt. H. G. Ansell; F/O. N. Ashburner; Sgt. O. M. Atkins; Sgt. A. V. M. Barron; F/O. J. Basten; P/O. H. O. Batchelor; Sgt. R. Booth; Sgt. R. H. D. Bouttell; Sgt. V. G. E. Briant; P/O. V. G. Brown; Sgt. C. A. Budd; Flt. Sgt. C. Butterworth; Flt. Sgt. P. J. Capon; Sgt. B. H. Cockcroft; P/O. A. B. Cocking; Sgt. J. C. Combes; Flt. Sgt. F. Dawson; Sgt. G. W. F. Duckett; P/O. A. M. Garrington; Sgt. C. B. Gazzard; Flt. Lt. L. H. A. Harper; Sgt. P. A. Harris; Act. Wing Cdr. W. R. Haskell, D.F.C.; Sgt. C. Haynes; P/O. G. E. Hickling; Flt. Sgt. R. F. Holdaway; Sgt. J. Howarth; Sgt. G. Humble; Sgt. J. A. Hutchinson; F/O. D. B. Ireland; Sgt. J. E. Irwin; Sgt. D. A. James; Sgt. J. E. John; P/O. T. W. Johnson; Sgt. J. M. Jones; Sgt. H. F. Jowett; Sgt. J. B. Kershaw; Sgt. S. T. Kitching; Sgt. C. M. Knox; F/O. H. Laverick; Sgt. E. LeHuray; Sgt. C. N. Lee; Flt. Sgt. J. A. Mallinson; Flt. Sgt. J. Mellor; F/O. P. C. Moxham; Sgt. J. Norman; Sgt. D. E. Nye; P/O. P. J. O'Donnell; Sgt. G. Ogden; Act. Flt. Lt. G. G. Paul; Sgt. W. T. Peace; Sgt. H. Pennell; F/O. F. Plant; Sgt. J. C. L. Price; Sgt. A. Ridley; Sgt. T. A. Roberts; Sgt. A. Rolfe; Sgt. F. G. Shaw; Sgt. F. Shaw; Sgt. R. J. Smart; F/O. C. Smith; Sgt. E. W. Smith; Sgt. R. A. Smith; Sgt. P. G. Straker; Sgt. R. A. M. Stringer; Sgt. E. A. C. Thirlettle; Sgt. A. E. Turner; Sgt. F. Wilkinson; Sgt. J. W. Wilkinson; Sgt. C. P. Williams; Act. Flt. Lt. H. S. Wilson.

WOUNDED OR INJURED IN ACTION.—Flt. Sgt. R. N. Blyth; Sgt. L. C. Browne; Sgt. F. B. Dew; W/O. H. Ellis.

DIED OF WOUNDS OR INJURIES RECEIVED IN ACTION.—F/O. P. A. Davidson; Flt. Sgt. R. J. Hayes; Flt. Sgt. L. Jones.

MISSING, BELIEVED KILLED IN ACTION.—W/O. E. H. Baker; F/O. S. H. Barnard; Flt. Sgt. R. A. Bond; Flt. Sgt. R. Coates; Flt. Sgt. E. A. Davies; Sgt. K. Dickinson; Sgt. R. G. James; W/O. G. F. McMillan; Sgt. C. J. Parkinson; Sgt. I. A. Pretswell; Sgt. R. W. Richardson; Sgt. N. V. Ward.

MISSING.—Sgt. K. H. Allaker; F/O. A. L. Andrews; Flt. Lt. H. L. Ashman; Sgt. A. E. Bachelor; Sgt. F. H. Baker; P/O. B. O. Baldwin; Flt. Sgt. E. W. Bark; Sgt. M. P. B. Barrow; P/O. A. H. Barton; Sgt. R. R. C. Bartram; Sgt. E. L. Belcher; Sgt. J. Birch; Sgt. P. W. Bishop; Flt. Sgt. H. M. Bittiner; W/O. E. M. Boon; Flt. Lt. C. S. Bradford; Sgt. F. J. Broad; Sgt. A. S. Broad; Sgt. B. P. Cane; Sgt. L. L. Chittock; Flt. Sgt. A. A. Clark; P/O. J. Colvin; Sgt. G. J. Cooper; Act. Flt. Lt. G. C. Crew, D.F.C.; Sgt. W. R. Crompton; Sgt. G. Crosse; Sgt. R. S. Dickinson; Sgt. F. L. Dolamore, D.F.M.; Flt. Sgt. R. Dunk; Flt. Lt. J. A. Finn; Flt. Lt. J. Fotheringham-Parker; Sgt. W. T. Francis; Flt. Sgt. C. A. Goode; Sgt. N. W. Green; P/O. E. Grisdale; Sgt. E. W. Haigh; Flt. Sgt. S. J. Hall; Flt. Sgt. J. Hayhurst; Sgt. R. J. Head; P/O. E. T. Heard; Flt. Sgt. R. B. Henderson; F/O. D. B. F. Heslop, D.F.C.; Sgt. K. Hodgkinson; Sgt. J. Horrocks; Flt. Sgt. A. F. Humphrey; Flt. Sgt. G. B. Hyndman; Sgt. S. Jackson; Flt. Sgt. J. A. Jones; P/O. G. A. Langford; Flt. Sgt. R. D. Langford; Sgt. R. V. Lawrence; W/O. E. A. Mason; Flt. Lt. A. D. May; Sgt. A. S. Millar; Flt. Lt. P. C. Morgan, D.F.M.; Sgt. M. Muir; Sgt. H. MacD. Mundy; Sgt. S. Neale; Sgt. J. Newlands; Sgt. K. J. Nuttycombe; Sgt. S. Patterson; Sgt. H. E. Pearson; Sgt. A. G. Porter; F/O. C. C. Price; Sgt. D. Reid; Sgt. J. M. Robertson; Sgt. R. E. D. Robinson; Sgt. R. A. Rose; Sgt. W. E. Samler; Sgt. C. Scargill; F/O. P. R. Sewell; Flt. Sgt. K. Shaw; Sgt. G. Shutt; F/O. J. E. Sidnell; Sgt. R. G. V. Simpson; F/O. D. F. Smart; Sgt. J. G. Smith; Sgt. R. E. Smith; P/O. A. Snell; Sgt. W. C. Spencer; Flt. Sgt. W. Steane; F/O. J. D. Thorogood; Flt. Sgt. D. G. C. Thorpe; Sgt. E. Tickner; F/O. S. G. Turner; P/O. E. Vallely; F/O. N. J. Wakeham; Sgt. H. J. Walker; Sgt. W. E. Wallis; Flt. Sgt. P. C. Warwick; Act. Sqn. Ldr. W. G. Watson, D.F.C.; P/O. G. R. Wellsman; Sgt. D. White; Sgt. L. J. Witcomb; Sgt. G. K. Woodward; Flt. Sgt. R. F. Yates.

MISSING, BELIEVED KILLED ON ACTIVE SERVICE.—Sgt. A. A. Gebbie; L.A/C. A. E. Hunter.

KILLED ON ACTIVE SERVICE.—Sgt. E. G. J. Bridgeman; Sgt. B. Broe; Sgt. A. H. Brown; Sgt. A. D. Clark; Sgt. W. Coldwell; Sgt. H. G. Colgate; Act. Sqn. Ldr. A. G. Dawson; F/O. S. Freeman; Flt. Sgt. W. Goudie; Act. Sqn. Ldr. A. D. Graham; Flt. Sgt. C. J. Gubbins; Sgt. L. N. Gurden; P/O. J. Hetherington; F/O. K. A. Howes; Act. Sqn. Ldr. S. W. Kellow; Sgt. P. Kindlen; A/C.2 B. King; Flt. Sgt. J. P. McDougall; Sgt. J. G. Middlemas; Sgt. D. Nicholls; Sgt. D. R. Persse; Sgt. D. A. Pickering; Sgt. J. H. Pirnie; A/C.1 A. E. Roberts; F/O. J. Smith; W/O. H. L. Walters, D.F.M.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Sgt. I. T. Frank; Sgt. R. Hallums; Sgt. R. D. MacDonald; F/O. E. E. Wall; P/O. A. A. Whitman.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Sgt. A. E. Harris.

DIED ON ACTIVE SERVICE.—A/C.2 A. E. Allan; A/C.2 R. Batting; Cpl. P. A. Botham; L.A/C. C. W. Cartwright; Flt. Sgt. J. Dimond; A/C.2 K. C. Gibb; L.A/C. S. F. V. Jones; Sgt. D. McRae; L.A/C. A. T. Paterson; F/O. C. H. Scales; A/C.2 A. Warburton; L.A/C. E. Whitelaw; A/C.2 S. F. Richardson.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—W/O. R. W. Aitken-Quack; P/O. F. A. Carter; Sgt. J. H. Williams.

IMPORTED INSECT: A Northrop Black Widow, minus wings, rudders, airscrews and elevators, being hoisted from a ship at a British port.

Women's Auxiliary Air Force

DIED ON ACTIVE SERVICE.—A/C.2 F. T. Currie.

Royal Australian Air Force

KILLED IN ACTION.—F/O. R. H. Altoft; F/O. M. E. Collett; F/O. D. A. Cumming; Flt. Sgt. F. Stevenson; Flt. Sgt. H. K. Young.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. F. L. R. Lloyd; P/O. A. S. Mitchell.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—P/O. R. J. Adams; Flt. Sgt. R. Brown; Flt. Sgt. A. D. Drewe; Flt. Sgt. C. A. Fleischfresser; P/O. N. R. Frazer; Flt. Sgt. G. H. Hughes; Flt. Sgt. B. Kerlin; Flt. Sgt. O. J. Tanner.

MISSING, BELIEVED KILLED IN ACTION.—P/O. R. J. Peggs.

MISSING.—W/O. J. W. Goddard; F/O. D. M. Gow; Flt. Sgt. M. H. Graydon; P/O. A. J. N. Hockley; F/O. G. R. Howe; Flt. Sgt. P. S. Wade.

KILLED ON ACTIVE SERVICE.—Flt. Lt. K. N. Cooling.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. L. E. Jackson.

Royal Canadian Air Force

KILLED IN ACTION.—F/O. T. J. E. Zadworny.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. G. A. Fletcher.

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW REPORTED KILLED IN ACTION.—W/O. J. T. R. Corriveau.

MISSING, BELIEVED KILLED IN ACTION.—W/O. W. Baxter; F/O. A. M. Beatty; P/O. S. S. Finlayson; Sgt. V. A. Goodwin; Flt. Sgt. J. J. M. Levasseur; W/O. J. R. H. B. C. Mallette; W/O. J. B. Morritt; F/O. H. W. Smith; Flt. Sgt. L. Spensley; F/O. J. O. A. R. Tetrault.

MISSING.—P/O. J. R. Bradley; W/O. W. E. Brown; Sgt. R. P. Cummins; W/O. P. A. J. Desico; F/O. W. J. Elliott; P/O. W. B. Ernst; Flt. Sgt. G. F. Freeman; F/O. R. P. Gagnebin; F/O. R. A. Irwin; Sgt. J. W. C. Labelle; W/O. J. A. Laing; F/O. E. E. Laporte; Sgt. J. M. Logelin; F/O. T. C. McGowan; Flt. Lt. E. L. Mallett; Sgt. G. H. Nelson; Sgt. R. S. Piers; Flt. Sgt. R. H. Punter; Flt. Lt. J. W. Saville; Sgt. T. F. Scott; Sgt. F. C. Stevens; W/O. K. C. Sweatman; Flt. Lt. E. Thurston; W/O. A. A. J. Tremblay; P/O. W. G. Wakely; F/O. E. H. Widdess.

KILLED ON ACTIVE SERVICE.—F/O. B. H. Bobesch; Sgt. T. E. R. Donnelly; F/O. R. F. Edwards; F/O. W. S. Garland; Sgt. J. E. Gray; Sgt. N. T. Kester; F/O. W. D. Lewis; Sgt. G. Long; Sgt. R. R. Lynch; W/O. A. T. Noble; F/O. D. F. G. Parker, D.F.M.; P/O. G. B. Sanderson; F/O. N. Stusiak; Sgt. W. F. Wolf; Flt. Sgt. A. L. Wood; Sgt. D. Wright.

WOUNDED OR INJURED ON ACTIVE SERVICE.—W/O. W. M. Blaine.

DIED OF WOUNDS OR INJURIES RECEIVED ON ACTIVE SERVICE.—Flt. Sgt. T. M. Stewart.

DIED ON ACTIVE SERVICE.—P/O. J. J. Burke.

Royal New Zealand Air Force

PREVIOUSLY REPORTED MISSING, BELIEVED KILLED IN ACTION, NOW PRESUMED KILLED IN ACTION.—P/O. M. A. Ericksen; P/O. J. Third.

PREVIOUSLY REPORTED MISSING, NOW PRESUMED KILLED IN ACTION.—Flt. Sgt. F. W. Thorstensen.

MISSING.—P/O. B. W. Windsor, D.F.M.

KILLED ON ACTIVE SERVICE.—F/O. D. L. B. Chapman.

PREVIOUSLY REPORTED MISSING, NOW REPORTED PRISONER OF WAR.—P/O. A. P. Chisholm.

South African Air Force

MISSING, BELIEVED KILLED IN ACTION.—Capt. J. O. De Waal; Lt. J. H. Jooste.

MISSING.—Maj. J. P. De Villiers, D.F.C.; W/O. J. A. Floquet; Lt. Hanson; W/O. G. E. Savage; Lt. P. J. B. Van Dyk.

WOUNDED OR INJURED ON ACTIVE SERVICE.—Lt. V. Vincent.